

IN THIS ISSUE

Vegas Night. IBM will roll products like dice at Comdex, including the OS/2 LAN Server, a 16M bit/sec. Token-Ring, a laptop and possibly a new PS/2 model. Page 184.

Buy some Reid. Users are already spotting bugs in Dbase IV, as well as compatibility problems, but are still hesitant to desert the program. Page 185.

NEWS

4 Collinet hopes to cash in on Unix DBMS, signs software deal with AT&T.

6 A profile of the alleged brain behind the worm.

6 Assorted assessments of the damage caused by the viral assault.

8 IBM shops appear to have high resistance to viruses.

10 Worm Anatomy 101.

10 Sendmail's developer speaks out in his own defense.

14 There are some lessons to be learned from the attack, apparently.

14 Things are just beginning to pop at Cornell in wake of worm incident.

16 The FBI is on the virus case but may have trouble with the prosecution.

20 Presenting the Achievement in Managing Information Technology award winners.

184 Novell to unveil network reliability analysis program.

184 Microsoft and HP come up with Presentation Manager-style Unix interface.

184 Age of what? DEC dumps Aquarius in favor of air-cooled mainframe.

SYSTEMS & SOFTWARE

31 IBM's System-Managed Storage is reshaping users' data-set mentality.

31 Pick prognosticates on a firm's future, preview product upgrade.

31 Industry leaders apalled at Unix squabbling, want unification.

MICROCOMPUTING

61 Tardy A/UX seems to have missed the Mac gravy train.

61 DOSed in space: Grid Systems laptops will travel aboard *Atlantis*.

61 Datebase 4.0 may propel vendor into spotlight at last.



Bright skies for 1989's PC managers? Page 133.

NETWORKING

87 DEC elbowers aside in eagerness to embrace the Micro Channel.

87 Boeing Computer Services takes a concerted crack at ISDN.

87 LAN, WAN stitchers increasingly rely on OSI thread.

MANAGEMENT

145 NASA research computer chief explores final frontier laden with federal baggage.

145 Unisys focuses melding efforts on IS staff, services.

COMPUTER INDUSTRY

155 Ex-Mitch chief aims competitive edge at EDDS.

155 Oracle's systems integration units gets federal help from Falcon.

155 Ross Systems undergoes self-buyout, eyes bigger hunk of DEC financial pie.

Quotable
Morris "should have taken two or three machines and formed a subnet ... Instead, Robert got famous for being a jerk."

MARK FRIEDELL
MORRIS THESIS ADVISER
AT HARVARD UNIVERSITY

COMPUTER CAREERS

165 Displaced MIS pros turn to teaching, but not all schools will have them.

TRENDS

186 Intel 80286 systems more popular than geriatric 8088s, fledgling 80386s.

PRODUCT SPOTLIGHT

115 PC CAD wins adherents among both seasoned users of high-end systems and those in the pencil set. By Charles Berman.

IN DEPTH

133 Here's what's on and what's off in microcomputing next year. By CW staff.

141 Cooperative processing: An idea whose time has not quite come. By David Baer.

OPINION & ANALYSIS

25 Cohn proposes novel new incarnations for your PC has-beens.

31 Gibson tunes in latest episode of Unix soap opera.

61 Barney separates the poop from the scoop in IBM 386 AT-bus affair.

87 Frisch finds net management a land of opportunity fraught with peril.

145 Connolly doesn't mind passing of the big computer show.

155 Wilder shares his industry reverie.

DEPARTMENTS

4 News Shorts

24 Editorial

120 Calendar

176 Marketplace

183 Stocks

186 Inside Lines

NEWS

Sun to set off Sparc

Wants spin-off firm to push RISC architecture

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. is looking to spin off a separate company to market its Scalable Processor Architecture (Sparc) to other systems manufacturers.

Sparc is a reduced instruction set CPU architecture that Sun has been attempting to establish as a standard in the workstation market. Sun has previously licensed it to both chip manufacturers and other computer vendors. By distancing itself somewhat from Sparc through the creation of a subsidiary, Sun appears to hope to broaden its acceptance among other vendors.

T. J. Rodgers, chief executive officer for Cypress Semiconductor Corp., said last Friday that Sun had called a weekend meeting of five chip vendors that hold licenses for Sparc. The topic of discussion was Sparc, Inc., an separate company that would set standards for the implementation of the architecture and market Sparc.

Sun Fast

Sun Chairman and Chief Executive Officer Scott McNealy was to lead the meeting, which was to be attended by Rodgers and representatives from Fujitsu Ltd., LSI Logic Corp., Texas Instruments, Inc. and Bipolar Integrated Technology, Inc.

"Sun wants to put some distance between itself and Sparc so that other system vendors

don't think of it as a conspiracy to get one-up on people who want to use it," Rodgers explained. "Sparc, Inc. would be the keeper of Sparc."

Sun officials declined to comment.

The spin-off would not be a manufacturer. A likely scenario would have each chip firm contributing an employee to the consortium, which would market Sparc to systems houses and set standards for future enhancements to the architecture, defining it further and addressing software issues, Rodgers said.

How licenses would be administered and royalties paid is yet to be settled. "That's the least important thing," Rodgers claimed. "The royalties Sun is charging for Sparc are very low. Any means that takes care of the royalties and license is fine with me."

A standards group is necessary because the architecture is loosely defined, Rodgers said. "The architecture is so general that very different chips can support the same architecture," he explained. "All the chip makers want the [Unix operating system] software and would like to provide it to our customers so that they wouldn't need to go to AT&T or Sun."

So far, Sun has licensed Sparc to only a few systems manufacturers. AT&T, Sun's partner in developing a new version of Unix and a Sun investor, has licensed Sparc for a new line of workstations. The others are Unisys Corp. and Xerox Corp.

MSA's pen writes with red ink in third quarter

BY CLINTON WILDER
CW STAFF

ATLANTA — Management Science America, Inc. will have to wait at least one more quarter to treat the profitable growth path that it hoped to achieve by cutting 230 jobs in September.

Last week, MSA announced its first quarterly operating loss of the year, \$1.6 million before taxes, on a 4% gain in revenue.

The sales increase was attributed to increased revenue from support of existing accounts. Revenue from new software license fees dropped 4% from \$2.2 million for the previous year's quarter to \$1.4 million. For the first nine months, new license fees plunged 18% from 1987 levels, and overall revenue declined 1% to \$190.7 million.

MSA's net loss for the quar-

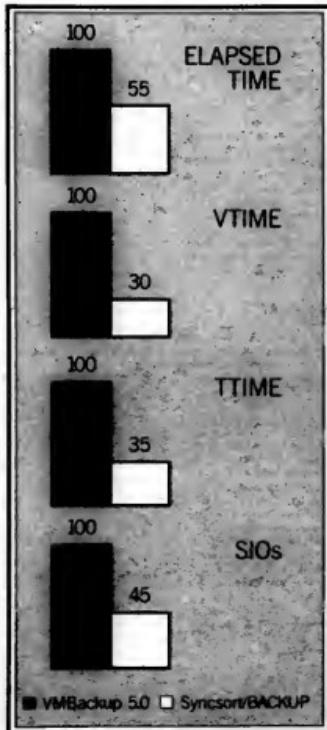
ter ended Sept. 30 was a whopping \$28.3 million, but \$27.9 million of that was a one-time charge for the layoffs and facilities closing measures announced Sept. 1. Revenue was \$55.9 million, compared with \$56.8 million a year earlier.

MSA's year has been marked by tumultuous events, including the departure of President William Graves and several other top executives and the rejection of an unsolicited takeover bid.

"All the bad news is symptomatic of their product portfolio being skewed to the mainframe and not ported to other platforms," said Michael Calvin, a computer industry analyst at Smith Barney, Harris Upham & Co. "Other than cutting costs, I haven't seen them doing the kinds of things they need to do around."

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NEWS SHORTS

Judge tosses out Visicalc suit

A federal judge in Boston has thrown out copyright infringement claims brought against Lotus Development Corp. by the makers of its 1-2-3 spreadsheet's predecessor, Visicalc. Judge Robert E. Keeton said Software Arts Production Corp. gave up its right to sue Lotus after Software Arts sold the bulk of its assets to the Cambridge, Mass.-based producer of 1-2-3 in 1985. The \$100 million lawsuit, filed in 1987, charged Lotus and its founder Mitchell D. Kapor with infringing on the copyright of Visicalc, a popular personal computer-based spreadsheet, when it created its now best-selling 1-2-3.

National Semi slide continues

After its first-quarter loss of \$30.5 million, National Semiconductor Corp. said it will post a significant operating loss for the second quarter ending Nov. 27. The first-quarter loss stemmed from problems at its subsidiary, mainframe producer National Advanced Systems. This time, the problems are on the chip side — sharply declining bookings and sales to distributors as well as overall softness in the semiconductor market, the company said. Meanwhile, National Semi reported that demand firmed up for NAS large systems and disk drives during the quarter.

Unisys admits to Army mischarges

The U.S. District Court in Arizona accepted a guilty plea Thursday from Unisys Corp. on three counts of labor mischarging in connection with a former Sperry Corp. contract with the U.S. Army. Unisys will pay a total of \$810,000 in criminal and civil fines. Because of ethics and integrity programs instituted at Unisys, the firm will not be suspended from doing business with the armed services as a result of the plea.

Advanced Micro to chop jobs

Advanced Micro Devices, Inc. and Thursday it will cut its work force by 1,000 jobs as it faces declining orders for its integrated circuits. "We expect sales to decline in the fourth quarter and forecast no significant improvement in the immediate future," Chairman W. J. Sanders III said. The reduction will not take place until January 1989, as the company decides how it will restructure in the face of softening demand.

Heavyweights in on Unix meeting

Apollo Computer, Inc., Digital Equipment Corp., Hewlett-Packard Co. and other Open Software Foundation (OSF) members were found on the roster of attendees at an AT&T Unix System V, Release 4 developers conference in Boston last week. Jointly sponsored by two OSF opponents, AT&T and Sun Microsystems, Inc., the fifth developers conference was intended to update system developers on the upcoming release of Unix from University of California at Berkeley Unix 4.3, Xenix and Unix System V. The release is scheduled for the third quarter of 1989.

Speak now or hold your peace

With one day left in the period allowed to protest the \$1 billion dollar award to AT&T of the U.S. Air Force contract, Honeywell Bull, Inc. filed a protest. Thursday with the General Services Administration's Board of Contract Appeals. The hotly contested contract for 20,000 Unix-based, multiuser systems was awarded to AT&T on Oct. 28. The board allowed two weeks for formal protests. Honeywell said that it was not fully informed of the contract requirements and that they were modified without Honeywell's knowledge. Honeywell also charged that its bid was a full \$100 million less than AT&T's.

CDC sells South African subsidiary

Control Data Corp. said last week it will sell its South African subsidiary to Unived Ltd., a South African holding company. Unived will provide services to CDC's customers in South Africa and will represent the company's product line there.

Cullinet tries to rebound with Unix DBMS debut

BY AMY CORTESE
CHICAGO

In a tactic designed to broaden its horizons, Cullinet Software, Inc. last Monday carried out its plans to enter the Unix market with the rollout of a Unix-based database management system.

Analysts said the move was a necessary step in Cullinet's strategy to recover from its post difficulties. For Cullinet, which has not been profitable since April 1986, the troubles began when IBM's DB2 emerged as the standard DBMS in Cullinet's traditional market.

Cullinet has been diversifying into new application product areas and onto additional platforms such as the Digital Equipment Corp. VAX. "We move into the Unix market to take the next step," according to Charles Walker, vice-president of N.Y.-based Cullinet Securities USA.

The Unix version of EnterpriseDB, Cullinet's VAX DBMS, formerly called IDMS/SQL, will initially be available on Sun Microsystems, Inc.'s Sun-3 and Sun-4 workstations under SunOS and on the IBM RT Personal Computer under IBM AIX. Jeff Papows, vice-president of corporate marketing at Cullinet, said the firm will support major versions of Unix and will walk the line between the Open Software Foundation and the Archcher Group.

The Unix version of EnterpriseDB reportedly will be available in the first quarter of 1989. Over time, the product will be made available on other major Unix platforms and environments, including the VAX and IBM 370. Cullinet is nearly finished porting its development tools to the Unix environment as well, but no date has been set for their availability.

Analysts approve

Analysts agreed the move was a good one for Cullinet, although it will not likely affect revenue in the short term. "They've come back with the strategy they need to have to become a leading player again," Walker said. But whether that strategy will work is still in question.

"Moving into the Unix market is the right thing for Cullinet to do, but it's not going to generate a lot of business" in that crowded market, said Scott McLaren, director of software tools research at International Data Corp., a market research firm in Framingham, Mass.

Walker, however, disagreed. She called Cullinet's product a powerful offering and said she believes the company will be a

formidable competitor.

The Unix DBMS is part of Cullinet's Enterprise strategy, outlined last month, which distinguished certain products by renaming them with the Enterprise prefix. Enterprise products now include VAX and the new Unix products; IBM's OS/2 and MVS are expected to follow.

The Enterprise strategy emphasizes cooperative processing among workstations and hosts in a client-server model.

The cornerstone of this strategy is its development technology contained in EnterpriseBuilder and EnterpriseGenerator (formerly known as KnowledgeBuild), which allow applications to be created to run across multiple platforms. As part of this focus on tools, Cullinet is also working on enterprise DBMS offerings, including Oracle Corp.'s Oracle and DEC's RDB, in addition to its own.

Cullinet's Unix-based DBMS prices will range from \$4,800 to \$91,800, depending on the hardware.

Tools for AT&T

In a related announcement, Cullinet said it signed a pact with AT&T to supply the firm with Unix System V versions of its development tools to run on AT&T's 3B minicomputers.

The contract involves AT&T's Information Management Services (IMS) group, which evaluates technology and promotes its growth among the development staffs of other AT&T business units. The IMS group does not support AT&T's Data Systems Group or Bell Laboratories, however.

Stan Godfrey, manager of systems development technology at IMS, said the intent is for the development staff to use Cullinet tools over other ones. The tools will be used to develop applications for internal use, which will run on either Unix System V or MVS systems.

CORRECTIONS

Brian Livingston, a member of the Microcomputer Managers Association, was incorrectly identified as its chairman (CW, Oct. 31). He is the chairman of the group's 486 standardization committee.

A story about Telxon Corp.'s settlement with Symbol Technologies, Inc. in their battle to acquire MSI Data Corp. (CW, Oct. 24) contained two errors. The price Symbol Technologies, Inc. will pay for MSI Data Corp. is \$2.33 a share; also, Telxon's payment to MSI is \$7 million up front as prepaid royalties.

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Portrait of an artist as a young hacker

BY JAMES DALY
CW STAFF

Those who lived, worked and programmed alongside Robert Tappan Morris Jr. paint a verbal portrait of a man far removed from the stereotypical slide rule-toting computer nerd. Instead, they describe their now-infamous friend as a well-read and articulate student whose curiosity got away from him.

"He's not a nerd, not a geek and certainly not a malicious computer hog," said a family friend Peter Neumann, a computer scientist at the SRI International scientific research center in Menlo Park, Calif. "He's bright and dedicated to computers, but there's nothing malicious or reckless about him."

Morris, who turned 23 on Election Day, is suspected of creating the virus that recently struck 6,000 computers in research centers, universities and military installations nationwide

and ground the Internet computer network to a near-halt.

Mark Friedell, an assistant professor of computer science at Harvard University who served as Morris' thesis adviser, theorized that his former student was probably exploring a faulty protection mechanism in the Unix operating system when he made a critical lapse in judgment at an important time. Morris "should have taken two or three machines and formed a subset, then disconnected it from Internet and let the virus spread," Friedell said. "Instead, Robert got famous for being a jerk."

Although computers are not Morris' all-consuming passion, he reportedly also enjoys hockey, skiing, hiking and reads voraciously — he spent so much time hovering over a computer screen that his friends referred to him by his logon, RTM.

Not that cracking a system was unthinkable for Morris. As news reports spread about the

virus, at least one friend thought he recognized Morris' handwriting. "I immediately thought of Robert when I heard about it," said Richard Draves, a graduate student at Carnegie-Mellon University in Pittsburgh who roomed with Morris for two summers. "I knew he had talents in the same areas the virus exploited."

Draves added that Morris said he enjoyed cracking passwords as a student at the Delbarton School, an exclusive private high school in Morristown, N.J. "But I thought he'd given up on that," Draves said.

Morris' background made him particularly well-suited to the deed. His father, Robert T. Morris Sr., is chief scientist and an expert on Unix security at the government's National Computer Security Center in Fort Meade, Md. The center, an arm of the National Security Agency, conducts research and sets standards for classified government computers and networks.

Still, others stressed that no actual evidence has yet been shown

linking Morris to the incident. Robert Constable, a professor of computer science at Cornell University who interviewed Morris when he applied for admission and played on the same computer science department hockey team, called Morris a "serious, independent thinker, confident and self-assured," but one who "showed no sign of the kind of immaturity" that creating the virus necessitated.

When the smoke clears, the

incident may be a mere bump in a promising career. "In the long run, Robert may be to him as a folk hero," Neumann said. "Maybe the way he did it wasn't the best way to do it, but if anyone is paying attention, he's done us a great service. In effect, he's said, 'Here's a Unix system that's not secure.'"

Senior writer Neil Margolis and Mid-Atlantic Correspondent Robert Moran also contributed to this report.



ERIC ALTMAN

Robert Morris Jr., suspect in the Arpanet virus attack, with his mother

The survivors' tale

In the final analysis, how bad was it? Not as bad as it could have been, victims seemed to agree. For one thing, the same network size and speed that led to the virus' rapid dissemination also led to early detection and a quick fix — but it was daunting in its scope nonetheless.

According to Hans-Werner Braun, head of Internet Engineering at Merit Computer Network, a Michigan-based network consortium providing regional networking services. "The Internet is almost ubiquitous at universities. Within it, you have about 500 active network nodes — probably even more. Each one of those computers could be a research center or university. All of them could have been affected by the virus — and probably were, to at least some extent."

A spokeswoman for the Defense Advanced Research Projects Agency said that several dozen of the 300 sites on the military network were attacked. However, according to Col. Thomas M. Herrick, manager of the Data Network, the virus did not affect any sensitive or classified military systems, because such systems are not linked to the unclassified Arpnet.

At Bellcore, the research advisory to the Bell operating companies, approximately 24 computers were affected by the virus, although several hundred computers were linked to both Arpnet and Internet networks.

Bellcore spokesman John Lucas said the penetration of the virus was minimal, but resulted in the shutdown of the several hundred computers. Bellcore employees worked from Thursday morning, throughout the weekend, and into the beginning of the week to complete Bellcore's cleaning operations.

At the National Aeronautics and Space Administration's Ames Research Center in Sunnyvale, Calif., computers were not back up until last Monday. In the meantime, unaffected machines were able to handle the work load, according to a NASA spokesman. Still, he warned that not all the site's computers were unaffected, only those that showed initial infection.

Back where all began, at MIT's Media Lab, the infection has apparently been rooted and all systems are go. However, even if there is no re-infection along the lines caused by the Ames Research Center spokesman, the virus has left its mark, said Media Lab researcher specialist Pascal Cheanis.

"There is a lot of tension across the network now," Cheanis said. "A lot of people are refusing mail." The spectre of a diminished sense of openness in the research community, which thrives on shared information, "is particularly disturbing. A lot of the labs over here are very open. If we lose that, that's really bad," he said.

Security

FROM PAGE 1

The 23-year-old hacker is suspected of unleashing the cleverly designed virus into the nationwide computer network the evening of Nov. 2. In only two days, the program spread to 6,000 computers, widely cloning itself and causing the machines to fill their memories to a point at which they could not function.

Some among the nation's community of computer users rushed to praise the genius of the worm program and hailed it for pointing out security weaknesses in the network. But while Morris is gaining folk-hero status in the general press, other computer researchers are calling for stern measures.

"If whoever is involved does not receive any punishment, then it is almost a guarantee that this will not be the last one you will see," said Gene Spafford, assistant professor in the department of computer sciences at Purdue University in West Lafayette, Ind. "The next one to come along will be even more spectacular."

Some Arpnet users worried that the incident would lead to a clamping down of access to computer resources. The answer to computer viruses is not higher security on the networks, said

Eric Altmann, creator of the Sendmail program largely suspected as the main access point for the virus. "Security gets in the way of sharing information," he said.

Computer scientists who have managed to isolate significant pieces of the virus' code said the program appeared to be benign. The researchers said that they had found a number of errors in the program, including one that enabled the virus to continuously clone itself inside a single computer.

A benign invader

"We are convinced to a high degree of certainty that the program was not written to destroy data," Spafford said. "Indirectly, it caused damage by causing a number of machines to fail or crash, interrupting work in progress and losing files."

Some Unix sites were unaffected because they had immunized themselves, something users and others could do — and should have — done. Prevention merely requires that users place a timer file in the root of the widely used Solaris file system, through which the virus initially entered, said Douglas McIlroy, director of the technical staff at the AT&T Bell Laboratories in Murray Hill, N.J. "When we received the code about a year ago,

we looked at it and decided we didn't want it like that around here," McIlroy said.

Morris, meanwhile, has sought sanctuary at the home of his parents in Arnold, Md. His father, Robert T. Morris Sr., is recognized as one of the country's top experts in computer security and is a chief scientist at the National Computer Security Center, the branch of the National Security Agency that focuses on computer security.

Computer researchers said that while the virus probably has been eradicated at most sites, it may be weeks before they can certain that it will not reappear.

"It could be still lurking out there," Spafford said. "It's possible that at some companies, it could have been left on workstations or on an employee's home office on vacation."

Spafford said fears that another hacker will pick up the virus' object code, make changes and dispatch it again through the network.

"This sort of attack is a little like terrorism; the more you advertise, the more it gives power to the creator," concurred Michael Tortorice, director of the Laboratory of Computer Science at MIT.

Washington Bureau Chief Mitch Biles and Mid-Atlantic correspondent Robert Moran contributed to this report.



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Virus scare shakes IBM MIS managers

BY ELISABETH HORWITT
OF STAFF

While insisting that their data centers are better defended than the academic and research systems, Internet MIS managers at large IBM shops are perturbed by the recent virus scare.

Several companies refused to discuss the ways they guard against a similar infestation. "The less said about it, the better," one manager said. "If we mention a specific product, someone out there might say, 'Gee, I can get around that.'"

However, certain types of products and procedures are used by most Fortune 500 business data centers, said Michael Hart, vice-president of Natick, Mass., consulting company MGT Technology Group.

Hart said most companies use either a homegrown security system or one of three security packages: IBM's RACF or Computer Associates International,

Inc.'s ACF II or Top Secret.

These systems "essentially interrogate the user before he can access a specific resource, such as a file or program," Hart said, as such, they act as a barrier against the kind of virus that attacks Internet.

With dial-up lines and capsule logon procedures, Internet is vulnerable to viruses that would not make an impression on a typical IBM System Network Architecture (SNA) data center, according to Hart.

Taking advantage

Before he joined MGT, Hart ran several data centers at General Motors Corp. and was also head of data security at Federated Department Stores, Inc. national data centers.

The kid took advantage of an openness that wouldn't happen in most SNA shops, where you rarely have dial-up access," Hart said. Shops that do have that kind of access generally use dial-back security, in which the caller gives some sort of identification and then hangs up so that the system can call the location associated with that ID.

Sears Communications Co., for instance, has installed RACF to guard mainframe access and uses private lines for the majority of its network, according to Gary West, vice-president of data communications and software services at the Sears, Roebuck and Co. subsidiary.

In the limited instances in which switched-line access is available, Sears has installed a connections management program, which uses dial-back IDs to provide users and other access to control and monitor access.

"We feel comfortable that the investment we made in [security] resources, people and software is sufficient to protect our network," West said.

Less at ease is William Burrows, a director at C. M. Alliance's information systems department. "A month ago I felt pretty safe, but I can only read so much [about viruses] before I get paranoid." The Hartford, Conn., insurance company uses ACF II, "but passwords and IDs only go so far; that's not total protection," Burrows said.

COMPUTER WORLD

AUTOR

We have placed 3 latent antibiotic bombs in your most important computer systems, which we will trigger if you pay us \$100,000. You have new viruses and we know if you pay us \$100,000, we will trigger them. Turn the operating system off. It cannot be turned on again.

You are prevent the bombs which we will withdraw with special transactions when the bombs are triggered.

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I am now writing to Defense ... They can't understand.

It is now written to the newspaper that may have been understand and service this is it. You can't tell them.

We have now written to see politicians from our area.

His RACF tape writer has been destroyed.

... The forgotten area at ...

This will make the IBM computer in 1985 look small.

... I am not in DC. He won't be able to take him.

Thanks for your help.

Verdict awaits monger: Hero or hacker?

Opinions ranged widely last week as to what fate should await the virus monger.

"Before it was clear that the thing was totally benign, I felt ... this guy ought to be flayed alive," said Howard McCausland, a network manager at Harvard University, where more than 20 systems were hit. Now, "I realize he's done us all something of a service by calling our attention to a hole" in the Internet system.

"I've taken a lot of flak for saying this, but I think in the final analysis he'll be seen as a folk hero," said Peter Neumann, a security expert at SRI International, Inc., in Menlo Park, Calif.

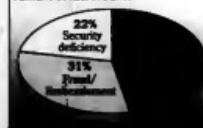
Not everyone was so generous. If the perpetrator receives just a "slap on the wrist, it would be nothing but an invitation for someone else to try it," said John Porter, associate provost of information technology at Boston University. "They're stakes ... years of computer time if you take the whole aggregate of systems that were shut down" nationwide, he said.

ALANI RYAN
and NELL MARGOLIS

Risk factors

A November 1987 survey of 390 DP and data security professionals indicated that one-third suffered financial losses from system problems; most of those losses were not attributed to security deficiencies

PERCENT OF RESPONDENTS*



SOURCE: KURTZ & WHITNEY
CHART

tion," Burrows said.

One possibly vulnerable spot for a company is the backup from its IBM Personal Computer to file servers that are connected to corporate mainframes. However, the real security risk comes not from the outside but from disgruntled employees on the inside, particularly systems programmers who understand how the operating system works and can subvert any security system, Hart said.

All the firms interviewed had procedures to keep people from inadvertently creating a chink in their system's armor. "We've given our employees a list of dos and don'ts in regard to computer

security," said Nicholas Ellsworth, a corporate security officer at Aetna Life & Casualty Co. "We treat systems security as part of corporate risk management."

However, Burrows said, "There is no protection from anyone who is determined and talented." Burrows said C. M. Alliance is trying to find a reliable vaccine, but "we haven't found one we can trust. You can't throw one in on an ad hoc basis — suppose it spreads?"

To hire or not to hire

thanking around in a mischievous fashion."

Evan Gruner, president of Alliant Computer Systems Corp. in Acton, Mass.,

"Nope. I'm not interested in people who are trying to play games and get around things. I think he showed a very bad attitude, and we have fired students from positions for doing similar things."

Scott Maguire, director of academic & research computing at Brandeis University in Waltham, Mass.,

"I keep reading about what a genius he is, but our academics don't think so. Clever, maybe, but not brilliant. There are other clever people around."

Alan Grossenbach, assistant to the director of Lincoln Laboratories in Lexington, Mass.

"We would. We're an entrepreneurial company and we

need creative people. It seems the more genius people have, the more out of the mainstream they are. If you're looking for mainstream people, you get mainstream work."

Dr. Albert Bandura, president of Phereson, Inc. in Rosslyn, Va.

"It would be out of the question. I still have ideas about private property and interference that I just don't think people have a right to feel around with."

John A. Patney, executive vice-president, Teachers Insurance and Annuity Association in New York.

"No, I would be concerned about security within the organization. Someone who really knows what he's doing could damage the system if he wanted to."

Karl J. Swanson, director of MIS at Trump Plaza Casino and Hotel in Atlantic City, N.J.

C computerworld called a number of people and asked them the simple question: "Would you hire Robert T. Morris Jr. if he applied for a position with your company?"

"We wouldn't do business with any firm that did. Just because you have the means to invade somebody else's domain and damage their work doesn't mean you become a vandal. There are many computer scientists who would no sooner dream of launching a virus than you would burn down a neighbor's house just because you know how to strike a match."

Gene Spafford, assistant professor of computer science at Purdue University in West Lafayette, Ind.

"I think we would, as long as he didn't [release the virus] with any malicious intent. Some very notable people in the industry these days started out as hackers

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MVS 265 tps

UNIX 124 tps

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AZ-Phoenix	Oct 13, Nov 8, Dec 6
CA-Costa Mesa	Oct 25, Nov 7
CA-Costa Mesa	Oct 4, Nov 11, Dec 1
CA-Los Angeles	Oct 18, Nov 15, Dec 13
CA-Oakland	Oct 4, Nov 11, Dec 1
CA-San Francisco	Oct 18, Nov 15, Dec 13
CA-San Francisco	Oct 27, Dec 28
CO-Denver	Oct 27, Dec 28
CO-Colorado Springs	Oct 25
CT-Hartford	Oct 6, Dec 7
DC-Washington (Federal)	Oct 21, Nov 29
FL-P.Lauderdale	Oct 28
FL-Jacksonville	Oct 19
GA-Atlanta	Dec 7
GA-Atlanta	Oct 3, Nov 9
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IL-Chicago	Oct 12
IL-Springfield	Oct 11, Nov 16, Dec 13
IL-Springfield	Nov 9
IN-Indianapolis	Oct 13, Nov 17
IL-Chicago	Oct 13
IL-Kentwood	Oct 13
LA-New Orleans	Oct 28, Dec 9
LA-New Orleans	Oct 19
MA-Boston	Oct 12, Dec 13
MA-Boston	Nov 10
MA-Boston	Oct 12
MD-Bethesda (Federals)	Dec 2
MD-Bethesda (Commercial)	Dec 2
MD-Baltimore	Oct 19, Dec 15
ME-Portland	Oct 3
ME-Dresden	Oct 4, Nov 8, Dec 7
MD-Baltimore	Oct 12
MD-Baltimore	Oct 19, Nov 16, Dec 13
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MD-Louis	Oct 18, Dec 14
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NC-Raleigh	Nov 2, Dec 14
NC-Winston-Salem	Oct 3
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NE-Bethel	Nov 9
NE-Bethel	Oct 19, Nov 17, Dec 15
NE-Bethel	Dec 15
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NY-New York City	Nov 9, Dec 16, Dec 7, Dec 20
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PA-Harrisburg	Dec 14
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TX-San Antonio	Nov 9, Dec 19
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Dissecting the anatomy of a worm

BY MICHAEL ALEXANDER
CP STAFF

The Arpanet virus entered computer systems through a back door in a Sendmail electronic mail utility that had been left there deliberately by the program's designer.

The virus also made use of a Unix program called Finger that was designed to let users know who was connected to what on the system, the user's telephone number, his location and other information. The program, allegedly created by Robert T. Morris Jr., used a little-known bug in

that program to take control of a machine and spread itself even further.

"As far as I know, he was the guy who first found the bug in the Finger daemon," said Richard Draves, a graduate student at Carnegie-Mellon University's computer science department.

"Exploiting it and making it work is a pretty significant programming achievement."

The program reportedly was designed to ask each computer that it encountered whether that computer had already been infected. If it had not, the virus would worm its way into that computer.

To get around false infected signals, the program was de-

signed to copy itself to the other machine after 10 queries, no matter what answer it received; computer scientists who have analyzed pieces of the program said that it should have made at least 10,000 queries before mailing itself to the next machine.

After completing this first ac-
tive stage, the virus sleeps for a while. When it awakes, it starts collecting "users" names and deciphering their words using a set of built-in words and brute computational force. Once armed with a new set of pass-
words, the virus begins its attack anew.

Sendmail developer speaks out

BY J. A. SAVAGE
CP STAFF

Eric Allman, currently senior systems programmer at the International Computer Science Institute in Berkeley, Calif., is the creator of the Sendmail program through which a virus entered the Arpanet network.

Allman developed Sendmail during the Ingres project at the University of California at Berkeley in 1978 through 1979.

Allman was never able to perfect his Sendmail system, he said, because it was appropriated for use before he was finished. "I wasn't allowed to fix the bugs on the system," he said. Instead, Allman put a backdoor debugging system in the network.

"When you turned on the debugging system, it disabled a security feature that keeps a user from sending mail if the system wasn't accounted properly. I figured that if you were already in the system, you could turn off the security feature," Allman said.

While attention has been focused on Sendmail, Allman defended his program, saying the worm virus had three other routes into the network even if there had been no glitches in the Sendmail program.

"One was simple password-cracking," he said. The virus perpetrator wrote a floating algorithm that apparently cracked about 5% of all the affected sites' passwords. Another way the virus got into the systems was through a Finger glitch, which allows a user to search user names and gives logon names and other personal and audit-trail information.

The third method of entry, according to Allman, was through a feature in the Unix system that allows a sort of speed dial on a local-area network without the formalities of using a password.

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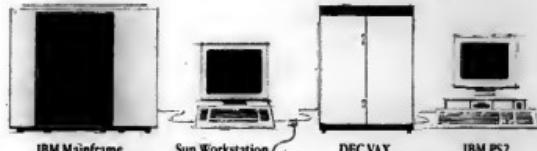
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What did the worm teach us?

BY NELL MARGOLIS
and ALAN J. RYAN
CW STAFF

Is there any moral to be drawn from the tale of the worm that ate the Arpanet?

Yes, said Hans-Werner Braun, chief of Internet engineering at Merit Computer Network, a Michigan-based consortium providing regional network services: "Computers aren't en-

tirely safe," and networks are not safe at all, he said. "If you want to be entirely secure don't connect to anything or put some very strong security systems into your host."

Also high on the unsafe list, according to Peter Neumann, a

security expert at Menlo Park, Calif.-based research center SRI International, Inc., is Unix, an operating system created by and for software developers to be particularly flexible and open—which, in the virus context, translates to "vulnerable."

According to a number of security experts, the cure is as easy as the threat is obvious.

Perhaps most important, Neumann said, is facing up to the security limits of technology and acting accordingly. Users "always have to apply some risk analysis," said Mike Hart, a partner at MGT Technology Group, Inc., a Natick, Mass.-based large-systems consulting firm

that specializes in security matters. For the universities and research groups that use Internet as a way to quicker the snail's pace of academic publication, he said, the speed and ease of networked exchange outweigh the risk of a virus attack.

While the potential lessons of the Arpanet invasion are great, Neumann said, they will not necessarily be realized.

Virus origin still under investigation

BY ROBERT MORAN
CW STAFF

At Cornell University, where the Arpanet virus infection is believed to have begun, two weeks has been sufficient only to assess and correct damages, prompt internal inquiries and meet agents from the Federal Bureau of Investigation.

Cornell, located in Ithaca, N.Y., will be turning over files to the FBI, whose security specialists will no doubt comb through them looking for evidence linking first-year graduate student Robert T. Morris Jr. to the virus. "We have no choice," said Robert Constable, professor of computer science at the university. "Not only will they be obtaining files, but they can also subpoena hardware."

Despite numerous articles appearing in the press linking both Morris and Cornell as the point of origin for the virus, M. Stuart Lynn, vice-president of information technologies, said, "We can't confirm that he was absolutely the person who did it."

Whether or not Morris actually was the responsible party, Cornell systems suffered effects similar to institutions around the nation. On Nov. 4, between 100 and 200 computers began slowing down and eventually shutting down.

The slowdown prompted Cornell personnel, sensing characteristics of virus behavior, to isolate its computers from all the national networks, Lynn said.

Further explorations followed while lines of communication were set up with the Unix community. This done, personnel started painstakingly determining which of the machines were affected.

Tracing the virus to its point of origin may be difficult but not impossible. According to Constable, "It is conceivable that we could trace the virus to a single node on the network."



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CEO grilling

FROM PAGE 1

bilities, he said. Typical CEO questions about the virus episode, Robinson said, include "Tell me how much I should be concerned about it. Is this really just a fear grenade, or is this a real problem outside the university environment? What level of

security is appropriate for our environment, and how do we compare to our peers?"

Chuck Gibson, director of operating system support at Phoenix-based Ramada, Inc., said he spent much of last week reading up on the recent virus incident in anticipation of executive inquiries.

"Conversations are just getting started, but I see a meeting

coming up. I want to be ready," Gibson said. "We haven't been hit by viruses, but it has made people at Ramada wonder how susceptible we are."

Bulletin board germs

Like many managers currently in the commercial sector, Gibson said Ramada makes little use of public networks such as those that were responsible for trans-

mitting the recent virus. However, he cited new concerns such as the possibility that a modern-equipped personal computer could pick up a virus from a bulletin board and then go on to infect a mainframe when the user toggles into terminal mode.

Robert Schroeder, manager of security and control at J. C. Penney Co. in Dallas, outlined his company's protective ac-

tions, which were typical of the plans that were cited by other managers.

He said employees are warned not to use bulletin board software or other unreliable programs but that since users are free to choose their own software, MIS encourages users to check a vendor and its products' reliability with MIS. Some managers said they have forbidden users from using software other than that which MIS supplies or approves.

Schroeder said his company is

THE SCARIEST thing is that we could have something like this inside our network just waiting to go off."

ROBERT SCHROEDER
J. C. PENNEY

evaluating products that vendors claim will act as antiviral vaccines and is working to keep fired employees from tampering with systems.

The recent transmission of a virus via a network raised at least one new concern, Schroeder said — the chance that J. C. Penney could pick up a virus through third-party network companies that handle some of the retailer's electronic data interchange (EDI) functions with suppliers.

Schroeder added that J. C. Penney will take a close look at these third-party partners.

Another manager whose company plans to move into EDI said the virus threat raises security concerns that must be addressed as the project proceeds.

Consider the banes

But Vincent H. Swoyer, vice-president of corporate systems at Sara Lee Corp. in Chicago, warned that no security measures should be so absolute that they hurt the company's ability to benefit from computers.

Swoyer likened the dilemma to someone ensuring that they could not get killed by a car or a terrorist. The only safe protection is to stay home all the time, he noted.

"It's like defending yourself against product tampering. It's not just a technical issue but one of deciding against people who want to do harm and don't have a reasonable intent," Swoyer said.

J. C. Penney's Schroeder added, "The scariest thing is that we could have something like this inside our network just waiting to go off. We've taken precautions, but we have to wonder whether something could have been in our systems for years just waiting for a certain time."

Senior Correspondent Mitch Betts contributed to this report.



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Virus' 'benign' nature will make it difficult to prosecute

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Federal Bureau of Investigation last week launched a full-scale criminal investigation of the Internet computer virus, but legal experts said it will not be an easy case to prosecute.

One problem is that the virus in this case was relatively benign and did not destroy data, and prosecutors find it easier

to build a case when data is lost, said Esther Roditi Schachter, a computer law expert in New York.

The mild nature of the virus may weaken the government's case, agreed Buck BloomBecker, director of the National Center for Computer Crime Data in Los Angeles. "It's not an insuperable problem, but the more bleeding bodies, the easier the prosecutor's job is," he said.

The FBI said its inquiry "will determine if harm has been done to any com-

puter system operated or controlled by a government agency." An FBI spokesman added, "If no harm has occurred, there is no federal violation."

The FBI originally claimed jurisdiction under the Computer Fraud and Abuse Act of 1986, which outlaws unauthorized access to federal computer systems. However, FBI Director William Sessions told a press conference on Thursday that the bureau is also looking at the possibility that other federal laws were violated.

Sessions reportedly mentioned federal statutes concerning wire fraud; malicious mischief involving government networks; and the Electronic Communications Privacy Act of 1986, which prohibits unauthorized access to electronic mail systems.

The FBI director added that the preliminary phase of the criminal investigation will probably be completed in the next two weeks.

Prosecution under the Computer Fraud and Abuse Act will be difficult because its language is subject to different interpretations, has not been clarified in court and has not been used in a computer virus case before, legal experts said.

For example, the parts of the statute most likely to apply to the virus case are limited to "intentional" acts. BloomBecker speculated a likely defense would be that the impact was not intended, adding, "A rule of thumb, [defense] doesn't work very well . . . but there are limits on your responsibility for unanticipated consequences of what you do."

What kind of access?

A second problem is that it is not clear what kind of "unauthorized access" means and how it will be applied to the virus case, according to Joseph B. Tompkins Jr., a Washington, D.C., attorney and chairman of the American Bar Association's computer crime task force.

Suppose the suspect had authorization to use the computer at Cornell University but not others on the Internet. That "raises the question of whether the statute means direct access or whether it covers all of the indirect accesses after the initial act," Tompkins said.

Even if charged, said a computer security expert who requested anonymity, the net cracker could prove hard to convict without a confession. "If I were called to the stand as an expert witness, shown the code, and asked if I could swear beyond a shadow of a doubt that the defendant wrote it, I'd have to say no," he admitted.

Tompkins said the Internet virus case is more likely to fall under two sections of the Computer Fraud and Abuse Act:

- The computer trespass misdemeanor, which covers intentional, unauthorized access of federal government computers when it affects the government's use or operation of the computer. The maximum penalty is one year in prison.

- A computer felony, which covers intentional, unauthorized access that "causes damage or destruction information . . . or prevents authorized use" of the computer, and thus causes the loss of at least \$1,000 during a one-year period. Maximum penalty is five years in prison.

The perpetrator could also be subject to state computer crime or trespass laws, as well as civil suits, Tompkins added.

The question of whether the virus caused any harm was underscored at a Pentagon press briefing. Department of Defense officials said the virus "wasn't designed to do anything more than be a nuisance." On the other hand, it forced dozens of Arpanet-linked computers to be shut down for roughly 24 hours, Department of Defense officials said.

The headline-grabbing Internet virus has already prompted calls for legislation addressing computer viruses. The first bill to specifically outlaw computer viruses was introduced on July 14 by U.S. Reps. Wiley Herenton (D-Calif.) and Bob Caudill (D-Mo.). The bill will be reintroduced next year and should get more attention in light of the Internet episode.

The bill states that introducing or disseminating computer viruses or other harmful computer programs carries a penalty of up to 10 years in prison, if the action affects interstate or foreign commerce. The bill, H.R. 5061, also allows victims to sue for civil damages.



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In the highly competitive arena of entertainment, the National Basketball Association has been scoring impressive wins. Commissioner David Stern points out, "The size of our business has almost tripled in 6 years. Our games are the core of what's become a wide range of enterprises - retail licensing, home video, TV production, publishing, event marketing, sponsorship and media sales - both domestically and internationally. Our continued growth depends on operating efficiently and intelligently - which is why we chose Digital."

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Five execs cited for achievement

BY ROBERT MORAN
OF STAFF

NEW YORK — Satisfaction does not come solely from a job well done or from recognition of a successful project within the organization, as the five winners of the 1986 Awards for Achievement in Managing Information Technology can attest.

The award recipients, who were chosen from more than



Otis' David

200 nominees, were selected for their outstanding achievement in applying both information systems and communications technology to foster decisive improvements in their companies' operations.

The awards — the second in an annual series cosponsored by American Management Systems, Inc. and the Graduate School of Industrial Administration of Carnegie Mellon University — honored the following executives:

- George David, president and chief executive officer of Otis Elevator Co. and senior vice-president of United Technologies Corp.
- George Feeney, senior vice-president of advanced development at The Dun & Bradstreet Corp.
- Charles Feld, vice-president of management service at Frito-Lay, Inc.
- Phyllis Gardner, director of the office of management programs of the civil division at the U.S. Department of Justice.
- John Singleton, chairman, CEO and president of Security Pacific Automation Co. and vice-chairman of Security Pacific Corp.

Hit the bottom line

According to Dean Elisabeth Bailey at the Graduate School of Industrial Administration, all the recipients brought a bottom-line impact to their organizations.

"They are not so much back-room awards," she said. "You can put your finger much closer on the difference that the technologies have made to the way that people are conducting business."

At Otis Elevator, David created a centralized, automated ser-

vice-call management system called Otsline that speeds service response to elevator malfunctions. The system, based on IBM 3090 mainframes, is on-line 24 hours a day, was five years in the making and helped leverage elevator sales with service con-

tracts and build long-term revenue.

Otis receives an average of 500,000 service calls per year. Because of Otsline, service personnel require only 75 minutes to arrive at a site from the time a call is made and 75 minutes for

service, according to David.

"We're a field labor company with 1,500 offices worldwide," he said. "Otsline provides a backbone or skeleton that binds the company together, but what it does today is only the tip of the iceberg.

"In the future,

Otsline will speed contract management, spare parts and delivery and help Otis control costs at remote sites, which incur 50% of the company's expenses."

Dun & Bradstreet's Feeney spearheaded Dunvoice, a voice information system that



Dun & Bradstreet's Feeney

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enables callers to use a push-button telephone to retrieve information from Dun & Bradstreet's numerous databases. Dunsvoice opened new markets for the company.

"Our emphasis is not an internal technological platform but a bridge between computer network for Frito-Lay's



Frito-Lay's
Feeney

the customer and the system. About 30,000 companies are now using the system, and we've been able to take the same concept and apply it to customized applications," Feeney said.

Field designed and implemented a handheld computer network for Frito-Lay's

more than 10,000 route salespeople. The network increased the amount of time salespeople were able to spend selling as well as improved accounting, inventory, marketing and manufacturing.

"The most exciting part of this award is that it is for a solid working technology, not for something we are getting ready to do," Field said. "Most systems

projects don't have as big a bang as this one. But our sales force embraced the technology, which is partly the reason we were able to bring it out several months ahead of schedule."

Gardner at the Department of Justice was able to increase productivity by 23%

for attorneys and 27% for clerical staff by automating litigation support activities and placed Justice Department attorneys on equal footing with those in the private sector.

"Because of burgeoning workloads and limited resources, we needed to automate litigation support activities," said Gardner, who, before the awards, accepted a new position as executive director at Steptoe & Johnson, a law firm in Washington, D.C.

"The future will be fast-forward. Decisions will have to be made quicker, and we will have to be much more responsive. Responsiveness will come from technologies that improve communications linkages, permitting work groups that produce more and at a higher quality."

Attention to management
At Security Pacific, Singleton implemented a management and performance monitoring program to reduce costs while improving the quality of automation services to many of the Security Pacific's operating units.

The monitoring program measures managers' abilities to develop staff, manage projects and meet budgets while main-

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HARRY SINGLETSON
Security Pacific's Singleton

taining specific service-level agreements.

"We've put in more major projects in the last 12 months than in our history, and our quality has been about 95% of user standards. We've done all of it with decreased costs," Singleton said.

"Of our top 60 managers, we've only lost four in the last three years," he continued. "If you keep people together, it's easy to form a tremendous team."

According to Patrick Gross, chairman of American Management Systems, the judges found that this year's recipients used technology to reach a higher level of achievement than did last year's recipients. Although the five were honored individually, Gross said, "The awards honor the technological achievements themselves."

Where do powerful ideas in networking come from?



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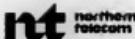
And that's made us the largest supplier of digital telecommunications equipment.

Northern Telecom puts the thrust behind NASA's data network at the Ames Research Center.

The mission: to carry a heavy payload of data from NASA computer networks to desktops throughout the Ames Research Center. And do it economically.

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EDITORIAL

Faint praise

ALMOST AS INCREDIBLE as the severity of the network virus that hit 12 days ago is the reaction in certain quarters to the alleged perpetrator of the disease.

Last week, the general business press carried one account after another in which research and information systems professionals praised and damn near canonized Robert Morris, the 23-year-old alleged mastermind of the most devastating attack on computer systems ever launched.

The *New York Times* quoted several people who were in almost ecclesiastical awe of the virus' feat. (It really was pretty amazing, we have to admit.) Major network news referred to his "brilliance in search of a creative outlet." And *USA Today* had a lead story about Morris, replete with posed photos of the little rascal at his Maryland home. "Brilliance has its roots in family life," screamed the *USA Today* headline.

There is little question of Morris' brilliance, that the degree of pure technical know-how to pull off such an act is deserving of some respect — however arcane.

Furthermore, there is a lot of good that will come from this infection, which caught the entire computing world with its pants down. Without a doubt, every major IS shop has at least reassessed its security. Judging from the land office business being logged at security firms, many people are actually beefing up heretofore inadequate security measures.

But let's not confuse the benefit that may result from this incident with the intent of the individual that caused it. The threat of burglars causes homeowners to take precautions against illegal entry, but we don't thank them and we certainly don't praise them for their efforts.

Instead, let's bear in mind that there is an entire body of law, constitutional and otherwise, designed specifically to protect private and public property. The virus was set into motion in utter and total disregard for this basic and inalienable right to protection of property.

The result of that action, whether it was intended or not, is the loss of millions of dollars in lost labor and the violation and corruption of a public network feeding hundreds of institutions that perform high-level research with a healthy slug of public money.

There is an even scarier element to this sordid affair. Like the virus itself, this sort of matter could well have an insidious way of replicating itself by prodding other hackers to try to emulate or top what Morris has allegedly done. It is nothing but a game to some people, and it will remain as such until the penalties applied are such that the game takes on a more serious complexion.

If these hackers can somehow serve humanity, then how about setting up a high-level hacker network and paying them to corrupt and violate? However, let them do it on their own time, without wrecking someone else's day.



LETTERS TO THE EDITOR

En Francais

While complimenting you on an excellent report on the Nippon Telegraph & Telephone (NTT) International Symposium on Integrated Services Digital Network (ISDN) [CW, Oct. 17], I would like to draw attention to what appears to be an important omission concerning the French ISDN system known as RNIS (the French acronym for ISDN).

RNIS, which will shortly go nationwide, went into commercial service in the Brittany region of western France on Dec. 21, 1987, and as such was the first 144K bit/sec. "2B+D" CCITT-compatible ISDN service.

Referring to NTT's ISDN as "nationwide" may be misleading. In fact, the Japanese system, like all others except the French one, is made up of "ISDN islands" based on geographical concentrations of digital switches — an essential network infrastructure requirement for ISDN implementation. In contrast, the therefore more nationwide, although sufficient digital (time division) capacity — as opposed to analog (space division) — is available throughout Japan.

As far as France is concerned, digital switching and transmission implementation began back in the early 1970s, and, at 50% to 60%, France Telecom's public telephone network is the most highly digitized in the world.

Thus, RNIS will cover the whole country by 1991 — years before any other national system — and may even start to compete with Transpac, France's existing 60,000-subscriber X.25 packet-switched network, before then.

International gateways are to

be made available to interconnect national ISDN services — at least in Europe, where all countries except the UK have unified state control of telecommunications.

*Raymond Bouli
Chief Technical Editor
GEID Press Agency
Paris*

One small detail

Your article "Competitors learn to play on tilted field" [CW, Aug. 29] was very informative regarding what the independent database management systems vendors have done and will do in the future to combat the pressure put on them by DB2.

Having so thoroughly reviewed each vendor's approach to a DB2/SQL solution, you missed one small detail. Adabas Software AG's DBMS, which ends in an 'e' at the end of its name, A minor point, I admit, among all of the information provided. But it bugged me just the same.

*Melinda Berger
Project Manager
SCT
McLean, Va.*

Open it up

I'm baffled by Ira David's letter [CW, Oct. 17] calling me naive for my belief that IBM's object code-only policy harms its customers, other software vendors and IBM itself.

IBM has indeed threatened to withhold source code for some time. This does not make it sensible or inevitable. IBM cannot yet safely ship software that is closed to customer repair and extension.

Exits, documentation and "promises to work with software vendors" do not provide

the flexibility of source-level enhancements to meet needs that are unanticipated by IBM developers.

Many customers and users groups believe IBM is wrong in its approach to object code-only, having failed to remove the need for source code before withdrawing the source code.

*Gabriel Goldberg
Director of Technology
VM Systems Group
Arlington, Va.*

The kinky truth

Robert Hargrove's "Publishing and perishing" [Viewpoint, CW, Oct. 24] was as much on the mark as was the lad in the story with which we're all familiar who shouted his opinion of the emperor's new clothes.

Hours of informal newsletters spew from desktop publishing systems, exhibiting the characteristic of novice producers of the most horrendous publishing prints at their fingertips. Inevitably, eye-driven ergonomics interface in attempts to impress others. The result is that message substitution gives way to formats that — to beholders such as I — are overly clever, cutsey and cluttered; yes, sometimes even kinky!

*Peter Kuchoushi
Information Resources
Consultant
Northeast Utilities
Hartford, Conn.*

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Labriola, Editor, Computerworld, P.O. Box 9171, 375 Conchita Road, Falmouth, Mass. 02740.

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REASONS 49-50

REASONS 1-14

REASONS 15-28

REASONS 29-30

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REASONS 43-44

REASONS 45-46

REASONS 47-48

REASONS 49-50

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The Next workstation; Another Job well-done

AMY WOHL

Hello, you doubters who thought that no one could hit the big time twice. Steve Jobs is back. And if the number of inches of major media ink you attract is a measure of product success, Next must already be a winner.

The question to ask yourself is, exactly what is he doing? And more importantly, what does it mean to Steve, to Next, and to the computer workstation market?

The Next workstation has already been described in infinite and admiring details. Of course, it is elegant; that is Jobs' trade-

tioned that this price would not hold in other markets.

Does this note mean Next is really aimed for the business marketplace? And how will it compete in that market if its price is substantially higher than competing products, especially given that prices of engineering workstations are beginning to decline?

Brilliant stroke

Actual underlying costs for the system are difficult to calculate, since it incorporates Canon's new — and as yet unpriced — magneto-optical removable disk technology. And what a brilliant stroke including that technology is.

If the machine is going to be targeted mainly at the education market, it will have to be sold to universities, not to students. Students simply can't afford Next's price tag.

But if the machines are to be shared, storage would obviously be a problem in terms of convenience and security.

In this machine, the storage device goes with the student. And with its 256M bytes of capacity, it should offer all but the most determined student writer adequate capacity for at least an MBA.

Will the sexy machine's appeal move it quickly into the business market? This is difficult to predict. The product is not ready to ship just yet.

In the academic market, the delay will not matter, since the 1988-89 academic budgets are largely spent. And the machine will be bought initially in small, experimental quantities, as any new technology should be.

In the business market, availability is more critical and could affect the product's credibility.

More importantly, few available Unix products can match the expectations raised by Next's elegant interface. Most products, would, in any case, need to be rewritten to the Workstation interface environment.

Get the ball rolling

So, once again, the acceptability and marketability of a beautiful computer product rests on the ability of the Unix market to generate software.

Will it be different this time? Will we, at last, get the ball rolling and match customer expectations and technical capability to available software, in quantity, in the commercial market?

Here, the news appears to be

Continued on page 26

What to do with leftover PCs

MICHAEL COHN



There are a handful of events in everyone's life that really measure one's conviction. Weddings. Divorce. Buying personal computers.

Yes, like it or not, purchasing a new PC ranks high on the truamalist.

No matter whether you are buying one for the den or are buying 100 for the division in which you work, there is always the fear that next month something will come out that is better, faster, smarter and cheaper.

Before you take the plunge and buy, it is important that you prepare yourself for the even bigger question: What should you do with your old PC?

Hand-me-downs

The secondhand computer market is very big in Asia, although it is doubtful that anyone in America would be too excited about covering the plane fare for the three old PCs from the payroll department, even if one of them has a joystick.

You could consider the other standard options for ridng yourself of that PC — like giving it to charity or to an equipment broker.

However, it turns out that a 5-year-old portable is about as desirable as a 5-day-old sandwich, especially when the space bar works only when you hit it.

Cohn is a quality assurance representative based in Atlanta.

with a hammer. The trash compactor may suddenly seem the best alternative.

Here is where I can help. I have come up with some great ideas for your old PCs and accessories. Don't scratch that machine! Take a few of these ideas and soon you'll look forward to buying new PCs just so you can have some more old ones.

• Hold onto that old black-and-white monitor. Cut a hole in the top. Gut the insides. Fill it with water. Toss in a few goldfish and maybe a couple of those plastic sand-castle decorations for good measure, and you've got the Terminal Fish Bowl.

Oh, don't forget to unplug the thing before you try this at

Continued on page 26



JULIA THALFET

Dear Ross and Roger:

ART GILLIS



I was 10 years old when my dad died, and every man I know over the age of 30 tried to step in and act as a substitute for my loss.

I got advice from relatives and family friends close to me, and even from the guy at the corner store. I didn't ask for it, but I sure am glad I got it.

Sometimes, even today, I wish I had a little good old-fashioned advice whenever I slip up.

I think you fellows need some help yourselves right now, and I know you didn't ask for it, either.

I'm afraid you are both acting

like a couple of spoiled brats. You are going to waste a lot of talent bickering in the courtroom, and this country can't afford that kind of wasted time.

Stay where you are

That's right, you are going to lose. When successful men like the both of you get to the top, it is important for you to stay on the job and make sure your energies are put to work where it counts.

General Motors is building great cars again, Roger, and our country needs that success to keep Americans working.

You ought to know better than anyone, Ross, that contracts are won in the marketplace, not in the courtroom. When you rescued a friend of mine from an Iranian prison, you proved that you could win no matter what the odds were against you. Don't go soft on us now.

I'm afraid you both are fighting a personal battle with corporate hatchets. It ain't right, guys. Buy the hatchets and go do what you both do best.

What will your duds say?

Ross, you are a great entrepreneur. If you built Electronic Data Systems in 1962 with only a thousand bucks, you certainly don't need to buy Perot Systems by raiding EDS's employees.

Roger, I just spent a day at your facility in Plano, Texas, and even after 30 years in the information systems industry, I was overwhelmed with the super-high technology being used there. Really now, how much can Ross take away from you?

I don't know where your duds are right now, but do you really think this courtroom brawl is what they would expect?

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SYSTEMS & SOFTWARE

HARD TALK

Stanley Gibson

As the Unix turns



I'm waiting for the day when Phil Donahue, Oprah Winfrey or Morton Downey Jr. invites the key Unix/Open Software Foundation (OSF) players on their talk shows to have it out, arguing the Unix/OSF pros and cons.

That probably won't happen, but another chapter in the Unix soap opera was written recently at Unix Expo in New York. And it looks as if AT&T has come out ahead for now. By forming the Archer group and winning the Air Force contract [CW, Nov. 7], AT&T shored up its much-eroded credibility as custodian of Unix.

It is said that possession is nine-tenths of the law. Maybe that's why the pendulum has apparently swung back to AT&T, which does, after all, own Unix. AT&T also has a track record of Unix development and has a stable corps of employees working on further development.

The OSF, meanwhile, has a concept and is in the process of hiring workers to carry it out.

The Archer group is an attempt to remove from the OSF a rason d'être — that a variety

Continued on page 36

SMS spells relief

IBM release a step toward hands-off data storage

ANALYSIS

BY J. A. SAVAGE
CW STAFF

The fourth-quarter debut of an automatic storage management system may spell the first couple of letters in relief for users attempting to run data storage farms efficiently. But simply popping a pill and letting the software take over data storage allocation will not work.

"We have to get our act together first," said Ray Ishikata, computer resource manager at Charles Schwab & Co. in San Francisco.

Since the specifics of System-Managed Storage (SMS) were announced in April, users have been free to change what they think about data sets. SMS partitions data in logical sets and thus no longer requires users to think of physical collections of data. Ishikata said he has already overseen modifications to the company's direct-access storage device (DASD) farm and the way that data sets are handled so that the company's systems can take advantage of SMS's "attractive" functionality.

SMS, a module of IBM's MVS/ESA also known as Storage

Continued on page 42

Pick's president highlights growth, previews upgrade

IN PERSON

Although Dick Pick, president of Pick operating system, still performs some programming, his main concentration is on the design of the operating system.

Pick spoke recently with Computerworld Senior Writer Amy Cortese and Senior Editor Stanley Gibson.

It's true that our niche has been small to medium-sized businesses in the heartland of America, where Pick typically runs on

Continued on page 39

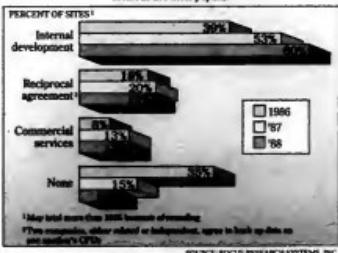


Dick Pick

Data View

Be prepared

Based on surveys of U.S. IBM and plug-compatible mainframe sites, most firms are now equipped for disaster recovery, and internal methods are most popular



Industry execs want one Unix

BY JEAN S. BOIZMAN
CW STAFF

CHICAGO — The standoff between the Open Software Foundation (OSF) and the Archer group, which backs AT&T's Unix System V, has left many executives at leading vendors standing on the sidelines, uneasy about the outcome.

At the recent Autofact show here, several industry leaders and they are concerned the progress in Unix will be hobbled

while the conflict rages.

"We think it's a shame," said Ed McCracken, president of Silicon Graphics, Inc., in Mountain View, Calif. "We'd like to see a common Unix, as would our users. The real issue is not if there would be one Unix or two, but what kind of Unix vs. everything else." Control Data Corp., an Archer group member, owns 20% of Silicon Graphics.

Intergraph Corp. Chairman

Continued on page 34

Inside

- Datavault banks on MIS insecurity, safeguarding data underground. Page 33.
- Estimating software development costs. Page 33.
- Packace: A reverse engineering tool. Page 33.

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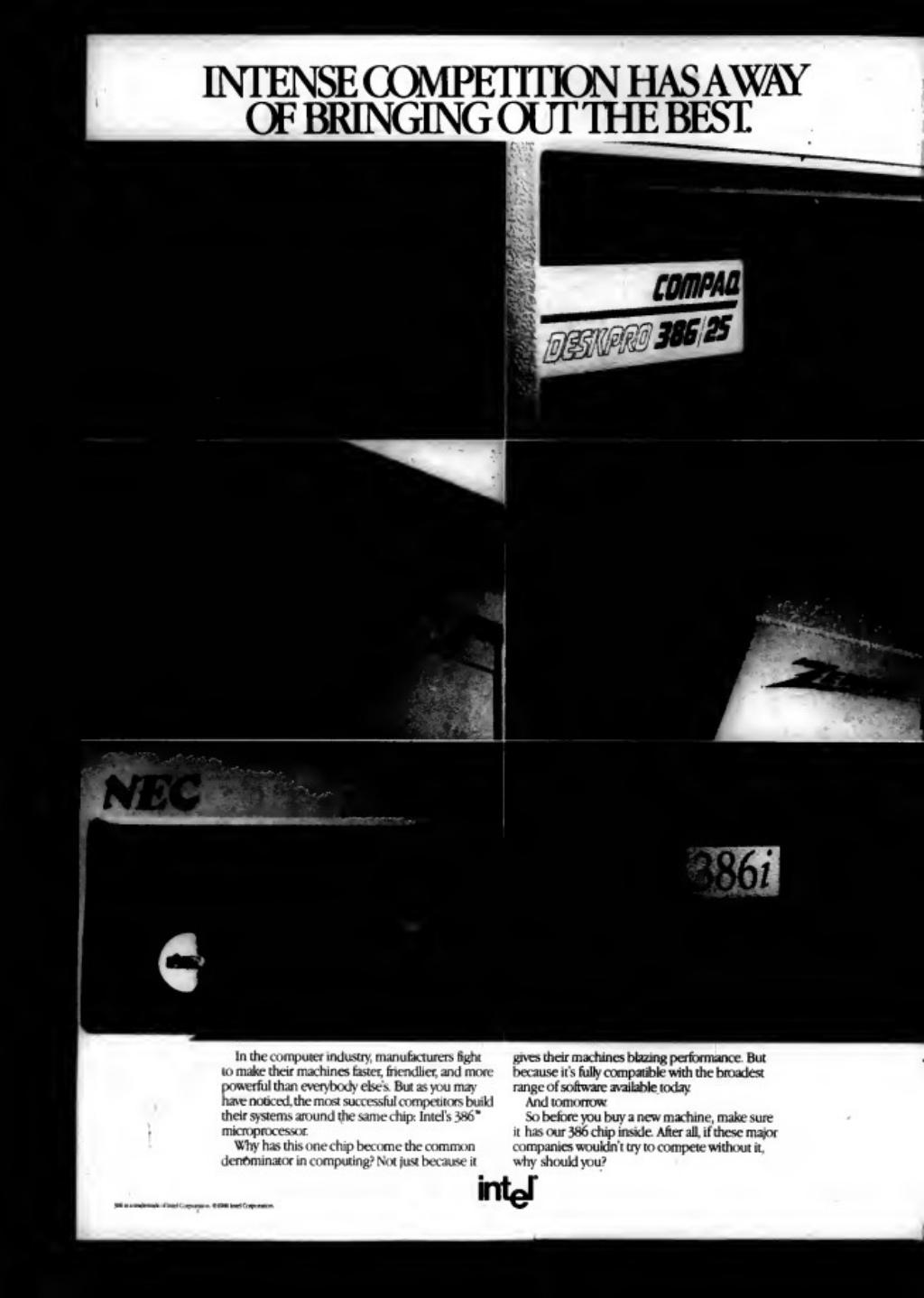
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intel

Safeguarding data underground

DataVault digs into abandoned missile silo for maximum-security site

BY ROSEMARY HAMILTON
CW STAFF

NEEDHAM, Mass. — Bud Stoddard, president of DataVault, Inc., is hoping MIS executives believe that when it comes to data storage, you can't be too secure.

That is why DataVault, which has been in the data storage business since 1982, recently began renovating an abandoned missile silo in the southeastern corner of Massachusetts.

The former Nike missile site in Dighton, Mass., will open in January as a maximum-security data storage facility, Stoddard said. In the 1950s, the Dighton facility was one of several nationwide Nike missile sites that were built to defend against possible aircraft missile attack.

In the 1960s, missiles advanced to ballistic systems and the Nike silos were no longer useful.

The facility has three separate bunkers, measuring 3,000 square feet apiece. Each bunker has steel doors and is surrounded by two-foot-thick concrete walls. Stoddard estimates that the three bunkers can accommodate 500,000 spools of data.

Feeding on paranoia

"There is, in fact, an executive paranoia that we're trying to feed on," Stoddard said. "Underground is typically (perceived as) more of a fortress. We wanted the most secure facility."

Stoddard is not the first to come up with an underground idea. Stoddard and there are at least five other companies pro-



DataVault's Stoddard

viding underground facilities.

One competitor Iron Mountain in Boston, which has been in the underground storage business since the 1950s and currently operates three underground sites in the Northeast. Its facilities include an iron ore mine, a 17-acre limestone cave in New York and an underground vault in Rhode Island built for the express purpose of storing computer media. A company spokeswoman said Iron Mountain has approximately 800 data storage clients using its underground service.

But not all data storage companies have found the underground business a booming one. An AT&T subsidiary, American Transtech, Inc. in Jacksonville,

Continued on page 46



Desolate entranceway to the Nike missile battery

Pacbase performs reverse-engineering

BY ROBERT MORAN
CW STAFF

NEW YORK — CGI Systems, Inc. announced recently that it will provide reverse-engineering services using its Pacbase computer-aided software engineering (CASE) product. Pacbase is a large CASE system designed at 100 U.S. mainframe sites.

CGI said it plans to offer automated reverse-engineering CASE tools for users in the future and will specify delivery dates early next year.

Currently, CGI personnel perform the service for the end user, using both automated and manual reverse-engineering techniques. CGI personnel first perform an audit of systems, application packages and development plans with an eye toward the underlying structure of the systems as well as the company's strategic goals. The audit costs between \$5,000 and \$10,000, depending on the systems.

A company that is not already using Pacbase would have to

purchase it for about \$250,000 in order to reengineer its system. CGI officials said the cost of reengineering individual systems can vary widely depending on the amount of work involved.

The Pearl River, N.Y., company claimed that in the first quarter of 1989 it will be able to offer when it will offer its tools to automatically restructure programs into ANSI-standard Cobol 85 code. CGI said it will also add expert system capabilities for pattern matching, procedure analysis and semantical analysis.

5G bytes of code

Irving Trust Co. in New York City is a Pacbase user considering using CGI's reverse-engineering service. The bank had about 5G bytes of source code to reengineer according to Ed Lipson, assistant vice-president at Irving Trust and an executive committee member of the Pacbase users group. He said his firm has about 125 applications

Continued on page 36

Estimating tools reap 85% accuracy, some say

BY AMY CORTESE
CW STAFF

Estimating the cost and time involved in a software development project is a difficult task, as any software manager will attest.

Ely Williamson, a senior consulting engineer at Du Post Co., faced a predicament familiar to many: development projects that were routinely over budget and behind schedule.

"That means something was not taken into consideration," she said, often the time required for documentation or soft factors such as the experience of the development staff.

Since using SPQR/20, an automated estimating tool by Software Productivity Research, Inc. (SPR), Williamson has found a higher degree of accuracy in estimating projects.

The problem, according to Capers Jones, chairman of SPR, is that most managers do not have enough historical information with which to compare current projects, as they often do not take all factors into consideration. Software that automates this task has been around for some time now but has been slow in making its way into commercial development efforts.

Most manually calculated estimates are off by anywhere

from 50% to 150%, according to Jones' research. By using an automated tool, estimates can be pinpointed within 15% of actual cost and time.

Deadline respecting

Williamson is also using SPQR/20 to measure the effectiveness of technologies and methodologies that Du Post has implemented, such as structured techniques. By using SPQR/20 to run through two development scenarios for the same project — based on the implementation of a new technology or product and, alternatively, the status quo — Williamson is able to decisively report increased productivity to her managers.

MIS could learn a lesson from its counterparts in the defense field. Most military organizations and defense contractors have estimating specialists dedicated to that task, as do most computer manufacturers.

According to Jones, 90% of military development and 50% of computer manufacturers use estimating software, compared with only 15% of commercial MIS. And it shows: Computer manufacturers and military agencies eliminate up to 94% of bugs, whereas with commercially developed software, the average is closer to 75%, he said.

X Window workstations out on shelves

BY JAMES DALY
CW STAFF

As MIT's X Window System emerges from academia into the commercial market, various vendors have begun to offer low-price workstations to function in the X Window environment.

Both Acer Computerpoint, Inc. and Visual Technologies, Inc. recently released display stations for the X Window system, a public-domain windowing and graphics system that provides a single interface whereby users can have access to the applications resident on a variety of systems.

Both companies are pitching — at personal computer prices — workstation-class graphics capabilities that are intended to take advantage of an X Window environment.

Although the X Window System can be ported onto any personal computer or workstation, the vendors claim that X Window display stations provide an inexpensive way of building networks on that environment while providing the necessary processing power for running the windows and user interface

that X Window applications require.

The display station typically provides a high-resolution display with a keyboard, mouse and local-area network connection.

San Jose, Calif.-based Acer recently introduced the first member in a forthcoming family

of networking terminals designed for users of host systems who want to hook up with the X Window System.

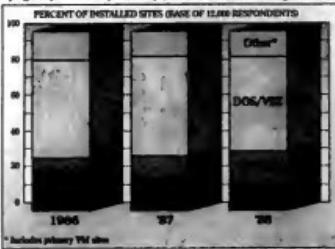
The Xehra Model 100, which will cost about \$1,000, features a 10-MHz Intel Corp. 8086 CPU with 640K bytes of random-access memory.

Continued on page 46

Data View

Stealing thunder

DOS/VSE is still the primary operating system of IBM and plug-compatible mainframe shops, but MVS/XA is attracting attention



SOURCE: FOSS RESEARCH SYSTEMS, INC., CINCINNATI

USAF pact lifts System V

AT&T's Kavner calls for rally around the Unix standard

BY AMY CORTESE
CW STAFF

NEW YORK — Unix System V got a much-needed lift from the recent Air Force contract awarded to AT&T. Now the telecommunications giant is hoping System V has enough momentum to gain ascendancy as the single Unix standard, according to Robert Kavner, president of AT&T's Data Systems Group.

Kavner discussed the \$929 million Air Force Computer Acquisition Contract

and its ramifications for the Unix community, including the Open Software Foundation (OSF), at a press briefing here last week.

"I hope OSF considers the offer we have put on the table to them, which essentially lets all rally around the System V kernel and move forward from there," Kavner said.

He noted that many OSF companies are shipping System V today. "I would hope seeing the U.S. government standardizing around System V will influence

them to stay on System V and keep shiping it."

Kavner said Archer group members are satisfied that AT&T will maintain a level Unix playing field. But he warned of an IBM-dominated Unix standard.

"My concern is that, for the computer companies to follow IBM's implementation of Unix, it could put all those companies in the position of closing behind IBM like they do in MS-DOS in the PC area," Kavner said.

When asked whether the whole debate was about corporate politics, Kavner disputed the idea. "This is a competitive issue, not theology. I want to remove the word politics. This is competition; this is a capitalist process, about market position, market share."

The Air Force contract, the largest in the history of computer procurements, amounts to nearly 10% of AT&T's 1988 computer revenues, Kavner said.

Kavner characterized the Air Force's choice of System V Interface Definition as "a natural decision in the Unix networking marketplace," upholding what he called the customer's right to specify a verification suite against which all vendors must compete. Digital Equipment Corp. and Wang Laboratories, Inc., protested that specification, but it was upheld.

When asked if the award signified a victory over IBM and AIX supporters, Kavner first downplayed the significance, but added, "I believe IBM bid and we won. That was a victory. It's a shot in the arm."

Kavner said that many of AT&T's customers have IBM environments, and a large part of AT&T's solution involves integrating AT&T office automation solutions with an IBM environment. "One of the biggest strengths AT&T has competitively is to be able to do systems integration among multiple vendors — which is natural if you think about AT&T's heritage in doing networking," Kavner said.

Industry execs

CONTINUED FROM PAGE 31

James Meadow said the AT&T-OSF fight is more political than technological. "I think it's terribly unfortunate that there are now two mainstream Unix camps," he said during Autofact's opening news conference. "I think a lot of business and ego issues got in the way."

Aked how Intergraph has responded to the situation, he said, "We have our feet firmly planted in both camps."

Apple Computer, Inc. Chief Executive Officer John Sculley said he, too, is displeased at the recent turn of events. "We've chosen to stay out of that battle because we have other important things to do," he told the Autofact plenary session. "We'll support whatever standard comes out."

While on the sidelines of the Unix battle, Apple is promoting its own Unix variant, A/UX. However, Unix standardization, if it comes, would mean that Microtropolis would play a smaller role in the arena. "Unix is becoming increasingly important in our world as a second operating system," Sculley said. When asked what Apple's Unix strategy is, Sculley shot back, "The bigger question is what is the world's Unix strategy?"

Scott McNealy, CEO of Sun Microsystems, Inc., said the formation of the Archer group satisfies a need that the OSF was created to address.

"This whole thing came about because AT&T was not being sensitive enough about joint development, pricing and licensing restrictions," McNealy said. "That has been resolved because AT&T was scared enough to form Archer."

Digital Equipment Corp. President Ken Olsen said the AT&T-OSF standoff is largely irrelevant. "If you follow the rules of POSIX, the software should be translatable," Olsen said, referring to the IEEE Unix interface specification.

"The press likes to talk about the disagreement on the two Unix kernels," Olsen said. "They like to sensationalize and they like conflict. Even if we have communications standards, even if we don't have [a] kernel standard, we'll get everyone communicating freely; that's the important thing."

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Pachbase performs

CONTINUED FROM PAGE 33

undergoing incremental enhancements or complete replacements.

Looking forward to the time when the automated system becomes available, Lipton said he anticipates being able to upload programs with Pachbase changing the data names to the standardized format.

Once uploaded, all maintenance can be performed from the Pachbase facility. The software will also assist Irving Trust with a large data modeling project by standardizing naming formats.

Irving Trust's 125 applications, however, are filled with a patchwork of fixes

applied by developers and maintainers throughout the life of each system. These patches will prove an obstacle to reverse engineering using a CASE tool unless the code can first be restructured.

One of two solutions

Lipton says one of two solutions is possible: he can use a restructuring facility that CGI said it plans to offer; or he can use another restructuring facility that is currently on the market. Lipton is now looking at IBM's Cobol SF to restructure the Cobol programs.

CGI officials also noted that other Cobol restructuring products on the market, such as Language Technology, Inc.'s Recoder, Group Operation's Superstructure and Peat Marwick Main & Co. subsidiary

Catalyst's Retrofit, could be used to re-engineer a program before it was reengineered under Pachbase.

The future enhancements, Lipton said, will erase the distinction between developers and maintainers — a distinction commonly found in most data centers.

With the help of the promised expert systems technology and a Cobol restructure, programmers will be able to work at the specification level. "At the specification level," Lipton said, "it doesn't matter whether programmers take new specifications or make changes to existing specifications."

Lipton added that while he expects experts to speed the programming process, he doubts that they will ever fully automate it.

Gibson

CONTINUED FROM PAGE 31

of major Unix players all deserved equal input into the development process. The complaint from OSF founders was that AT&T had taken private a basically open system. If that reason, which led to OSF's founding, is removed, are there enough remaining reasons for OSF to continue and to thrive?

As stated here before, despite OSF's claims to the moral high ground, which may be open to debate, users will not flock to OSF unless and until it produces a product that is better than that available elsewhere.

Meanwhile, the OSF is in the process of moving to new quarters in Cambridge, Mass., this week, in case you tried calling their old location in Lawrence, Mass. Visitors to OSF will no longer require map, compass, and a trusty scout to find headquarters. And you won't need a friendly matching grant to pay the cab fare from Boston's Logan Airport.

It looks like the 9370 is still a processor in search of an operating system. As noted in last week's Inside Lines column, the mid-range black sheep was absent the fold at IBM's huge display at Unix Expo.

Instead of the 9370 being a key Unix processor, as IBM once said it was, everyone now talks about the RT as a key mid-range Unix system.

Random discussions with independent software vendors show they are not seeing the 9370 in customer accounts. As a platform, it appears to be a nonissue.

In addition, IBM's recent benchmark counterblast to DEC's benchmarking was done under VSE, an operating system whose future is ambiguous. True, DEC tested 9370 and 4381 systems under VSE, so IBM wanted to do the same. But why not publish some VM, or even MVS, figures?

And while we're at it on benchmarking, how about some Application System/400 benchmark results? The processor was absent from the recent audit performed for IBM by Tom Sawyer of Codil & Davis Consulting Group.

Now that IBM is a member of the Transaction Processing Performance Council (TPC), maybe we can look for comprehensive audited benchmark results on a wide variety of IBM systems. Then again, simple agreement on a benchmarking standard does not necessarily mean thorough testing and publishing of those results according to that standard.

In the benchmark results that IBM released, the tests were conducted according to the point method that the TPC was developing, scoring 85 out of 100 points for complete Debit/Credit compliance.

However, the TPC has moved away from that point system and toward adopting TP1 and Debit/Credit as separate standards, according to Omri Serlin, who is leading the council.

Under the point system, a score of about 70 was roughly equivalent to TP1, while a score of 100 is equal to full Debit/Credit implementation, Serlin said.

Gibson is Computerworld's senior editor, software.



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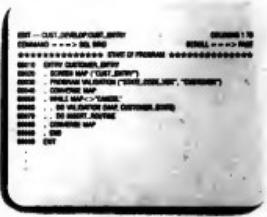
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Pick

CONTINUED FROM PAGE 31

multuser minicomputers. That is still our strongest area.

However, the Pick operating system is actually stronger now outside the U.S. In developing Pick, we set out to build a tool to run companies with, and it is growing both ways to include personal computers and larger systems. PCs are being used increasingly as multuser systems, and we are taking advantage of that. In Australia, IBM is shipping the RT with AIX and Pick. In America, SeattleOS, of whom Pick is majority owner, is doing this also.

You recently introduced an open-architecture version of Pick. Is this a completely new product?

The open-architecture system is a brand-new product — we tore down the old one and built it back up. We designed a foundation where you can bring in all available programs and have upward compatibility.

Every programmer's dream is to rewrite the system, but we tried to make it as totally upward-compatible as possible.

There are some reports that it is not entirely compatible and thus has caused some controversy. I don't think there is that much controversy. People get invested in a product and want to continue with it.

What are the benefits of the open-architecture version? Why should VARs embrace it?

In the open-architecture version, you can bring in outside tools, compilers, facilities and programs. You can add the functionality of all those things to the operating system to make it much richer.

What is the next enhancement we can look for?

Advanced Pick, which we have been working on for 2½ years, will be introduced after Comdex. It will include a dictionary-editor and is the last chunk to make Pick's robust data management operating system. It will be shipped at first to power beta users.

Will that be a free upgrade for current users under maintenance? We haven't worked out the details yet, but there will probably be a charge.

What is your approach to open architecture? While many system developers are minimizing the operating system and breaking out functionality, your approach seems to be the opposite.

We look at the system as a whole, as a completely generalized environment integrating data management with operating software. When you lay down, you lose the integrated approach.

That is similar to what IBM has done with the operating systems of the System/36 and Application System/400. Do you view the AS/400 as a strong competitive challenge?

The worldwide market for both Pick and the AS/400 systems has not even been tapped yet. Pick may have an advantage in that it uses far fewer lines of code. Pick has about 350,000 to 400,000 lines of code, while the OS/400 has roughly six million lines.

What would be your counterproposal to IBM AS/400 solution?

If it's an economic decision, Pick would win. A Pick solution comes to about \$1,000 per workstation.

IBM's ultimate database goal is a distributed relational model that would span its different architectures. Will you be able to answer that?

We are working on a comparable scheme. An advantage we would have is that we would be cheaper than IBM's alternative.

Do you see AT&T's Unix as a threat, or will Pick and Unix thrive by co-existing — something that is increasingly done?

We like to be consistent, and Pick works with all versions of Unix. The RT has AIX and Pick on the same box. Sequoia sells Pick as co-existent with Unix.

We are also co-existent with many other operating systems such as Stratus' VOS. We've been co-existent with IBM's VM for a long time. Prime's operating system is Pick-like.

Since Pick is a data management system with its own query language, how important is Posix compliance to your strategy?

That's something we're working on, but there's no time frame yet. We are working on an SQL compiler. To be a survivor, we will have to do more and more things like that.

Where does object-oriented technology fit in?

That's a new buzzword, but we've been doing it from the beginning. The essence and philosophy of Pick has been to focus on the data first before you think about writing the program. However, the new use of the term "object-oriented" is rigidly defining the technology.

Will Pick become part of the open systems effort? Could you join the Open Software Foundation?

Pick could join the OSF, probably as a member rather than as a sponsor, although we would like to have some influence. When OSF starts to work on data management, then Pick may submit a data management proposal.

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The 3000i records on industry standard 3480-type cartridges,



each with a formatted capacity of 320 megabytes. An optional 10 cartridge stacker increases total storage capacity to 3.2 gigabytes. There are 2 different 3000i series with 26 models in all. The series with an 8-inch form factor is the world's first tape drive system to address the size and high performance needs of workstations, midrange systems and small mainframes. The 5 1/4-inch form factor series will complement the economy and performance of micros and low-end minis.

3000i

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What about backup speed? Transfer rates range from 242 to 896 kilobytes per second. For instance, a Cipher 3000i drive, using only 2 cartridges, can backup a 500 megabyte disk in just 11 minutes. A high performance GCR open reel drive takes 4 reels of tape and twice the time to do the same job.

The 3000i offers a choice of configurations including horizontal or vertical mounting, tabletop and 19-inch rack mount versions. System integration couldn't be easier with a wide selection of interfaces—Cipher/Pertec, SCSI and IPI-3. AC or DC power. And standard 9-track reel-to-reel functionality is

a special feature of the 3000i. This ensures compatibility with existing system software and protects the enormous investment in software development.

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Storage

CONTINUED FROM PAGE 31

age Management Subsystem, is the first of many steps to a system-controlled placement and retrieval of information.

Several years and software updates down the road, logical data sets will automatically be placed in the proper storage medium according to the usefulness of the information. Such moves could save money if the system thinks more information could go to less expensive media or could be packed more efficiently into current media. They could save space if the system thinks that data can be well kept in more compact media.

Storage management has historically been a hands-on function. "That was not so when you had 10 or 20 volumes, but many now have 2,000," IBM SMS software designer Ed Daray said.

"That's the biggest impact of SMS so far; the mindset has changed drastically. Users are beginning to classify data at a data set level," said storage analyst Dave Vellante at Framingham, Mass.-based International Data Corp.

Ishikata, for instance, is driving just that in "data pools" — creating aside physical volumes and sets rather than particular pieces in data storage.

Since details of SMS have been available to users, Vellante said that the majority of IBM 3090 sites — the most likely to be the first to implement a new operating system — have new titles for the position of data capacity manager. Vellante said they are now given the title of "data administrator" or "storage administrator."

IBM plug-compatible manufacturers Amdahl Corp. and National Advanced Systems applauded IBM's direction with SMS, although IBM will have the market to itself for about a year. Amdahl and NAS have said they will offer it in late 1989.

How It Works

Once data is partitioned logically, SMS acts as the allocator of storage space.

"Instead of [sending data to] the round, brown, spinning thing" — Daray's term for a disk drive — "SMS has fast, medium and slow classes that have to do with performance," he said. It also has management classes, such as "idle" and "not very important" and "bottom-of-the-ladder" as well as data set classifications and storage group classifications, all of which are user-defined. With the early releases, users will also have to map storage devices to handle SMS.

The system is intended to choose the best place, whether it is DASD, tape or main memory, for the right storage with the right response time. For instance, a data set used rarely will be migrated to tape instead of taking up room on disk. It is also intended to make more complete use of DASD than is often the case today, where only part of the storage capacity is used in order to guarantee faster access.

IBM is going slow with releases of SMS. Daray said that there will certainly be more than two in the foreseeable future but could not say how many or how long it will take to fully implement them. Going slow will allow users to get used to separating data into logical entities rather than physical volumes.

Although he is already changing his disk drive configuration and developing test methodology, Ishikata said he will not jump on the first SMS release but will wait for improved functionality. He said he

thinks it will take another year of positioning, getting the most current MVS/XA release up and running on the company's IBM 3090 600E, before licensees a new operating system. "It could easily take another two or three years," he said.

This release is system-managed but administration is required. You want to get to system-managed, system-controlled," Daray said.

The separation of logical and physical may lead to a completely new storage architecture, Daray said. "Instead of a [disk drive], it could be a bubble," he said, referring to bubble memory, in which bubbles of data are activated or deactivated by electronic impulse and the alignment of the resulting bubbles determines the placement of information.

More likely than bubble memory is a storage device with direct interfaces, such as an extension of shared memory, according to Al Richard, manager of storage system marketing at Amdahl. He said there may not be channels as they are presently known; instead, the interface will be microcode.

In the third quarter of 1989, at about the time Amdahl and NAS will offer MVS/ESA compatibility, IBM has said it will also release SMS in its MVS/XA operating system but not update it.

Representatives from both plug-compatible manufacturers said that, in the long term, it will be good not only for their customers but also for the industry.

"Whether you need it or not, industries will want the ability to move to this

product," said B. J. Burson, NAS' manager of worldwide marketing. Amdahl's Richard said he expects all users to implement SMS over time.

Both will adopt microcode to allow compatibility. "Some aspects are very easy to do, others that'll be difficult, such as dual copy. We have to be software-compatible and find both copies," Burson said.

Richard also made a point of know day and close compatibility: "We know how to do dual copy; we don't have to wait for IBM. But we have to wait because compatibility comes first."

Neither firm would admit that SMS gives IBM the competitive advantage; each said they believe their added bells and whistles will take IBM's idea and make it better.

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SOFT NOTES

Compuserve, CA unite for color presentations

Compuserve Data Technologies, Inc., in Cambridge, Mass., signed a joint development agreement with Computer Associates International, Inc., in Garden City, N.Y. Compuserve is developing software to link its System 1032 fourth-generation language and database management system with Computer Associates' CA-Telgraf, a management charting package. The link will let end users turn data into colorful presentation graphics. System 1032 runs on Digital Equipment Corp.'s VAX line.

Unisys Corp. announced a marketing

agreement with EDI, Inc. in Gaithersburg, Md., a vendor of electronic data interchange translation software. Unisys and EDI will jointly market EDI's Telink and associated transaction sets in the Microsoft Corp. MS-DOS environment.

VI Corp. in Amherst, Mass., said it obtained Data Views software licenses to the Radiation Research Laboratory of the Louis Lourie University Medical Center in California. Data Views will be used to provide workstation monitoring and control for the laboratory's new proton accelerator, which is intended to provide precise

treatment of tumors.

Locus Computing Corp. in Inglewood, Calif., said it signed an agreement with DEC to distribute two Locus connectivity products for DEC's Ultrix version of AT&T's Unix operating system. The two Locus products are PC-interface and PC X-bridge, which connect MS-DOS operating systems to the Ultrix and X Window System environments.

Harris Corp. and American Management Systems, Inc. (AMS) have signed an agreement to market AMS' Uni interface

face with Harris' CX/UX version of AT&T's Unix operating system. CX/UX simultaneously supports AT&T's Unix System V and University of California at Berkeley Unix 4.2 environments. CX/UX runs on Harris HCX superminis.

Convex Computer Corp. in Richardson, Texas, announced that the X Window System is available on the Convex C Series of minicomputers. Convex calls its product CX Windows. Convex also said it is offering Convewin, a runtime library that provides compatibility with 85 of the most frequently used DEC VMS system services and runtime library routines.

Verdix Corp. and Atherton Technology signed an agreement to develop a commercial Ada programming support environment. The environment will be based on Verdix's Vads tool and Atherton's Software Backplane Integrated Project Environment. The products will allow programmers to integrate and automate third-party development tools to form a computer-aided software engineering environment based on the Ada language.

Pyramid Technology Corp. in Mountain View, Calif., recently announced a field-engineering support application called Field Force. Intended for service organizations, it comprises more than 15 different modules, including dispatching, logistics, contract maintenance and system configuration. The modules are available separately or in various combinations, with prices ranging from \$8,000 to \$50,000, depending on modules selected.

IBM said it will work with New York's Polytechnic University on a joint project that will help libraries better manage and automate libraries. Polytechnic University will act as a national demonstration site for IBM's Dobis/Leaven, a library document management system that integrates major library functions such as searching, acquisitions, cataloging and materials borrowing.

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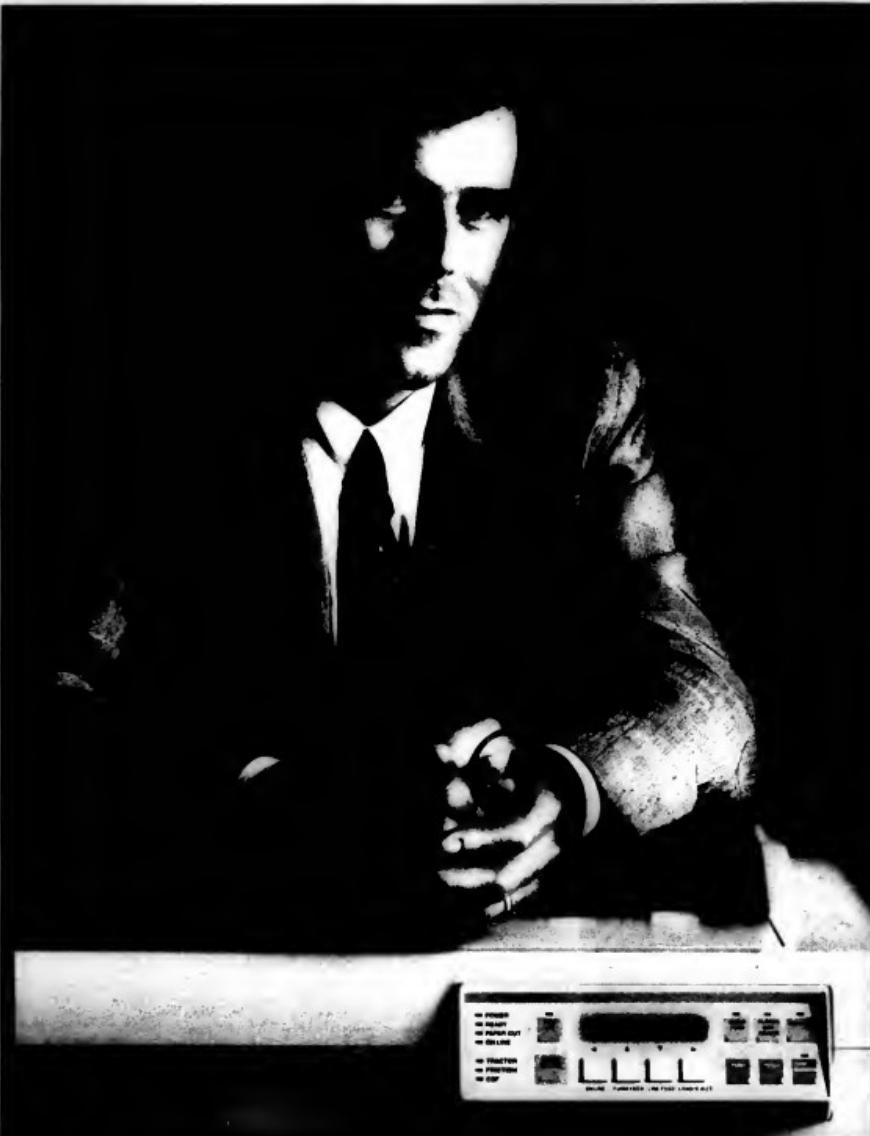
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Safeguarding

CONTINUED FROM PAGE 33

Fla., launched an underground storage service in 1984 but got out of the business a year later because the company found little customer interest, according to a company spokesman.

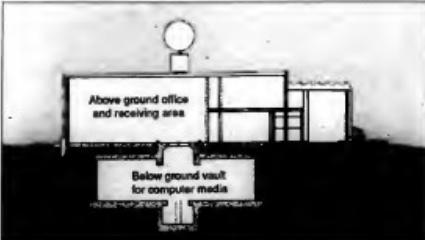
So far, Datavault has not signed on any clients for the former missile site. The company has 130 current clients that it services with an aboveground concrete warehouse facility in Needham, Mass., Stoddard said.

Fees for the underground site will be about 25% higher than those for the aboveground facility, Stoddard said. While individual client's fees vary, Stod-

dard estimates the average cost for service and storage for a single data tape to be about 50 cents per month.

Stoddard got into the data storage business with the intent of offering an underground facility, but one was not easy to find. There was another abandoned missile silo in Needham, but it was in a residential area and Stoddard could not obtain the proper zoning law changes for it. He discovered the Dighton site after launching his business with an above-ground facility.

Last year, Stoddard negotiated with the estate of the former owner and purchased the Dighton facility for \$500,000. He said he plans to pour in \$2.8 million in the next five years to renovate the site and install current security systems.



Floor plan for missile silo's conversion to a data storage facility

X Window

CONTINUED FROM PAGE 33

access memory, 512K bytes of read-only memory and a built-in Ethernet controller, the firm said.

The unit also features a 110-key detached keyboard, serial and parallel ports and a 14-in. monochrome bit-mapped display with 640- by 480-pixel resolution. The unit can also operate as a standard terminal over an RS-232 serial link to the host in the event of a network failure, Acer said.

Visual Technologies, Inc.'s 640 X Display Station (XDS) features a 14-in. monitor powered by a Motorola, Inc. 68000 processor and 1.024- by 800-pixel resolution. The 640 XDS sells for \$1,995 and is available now, according to the company.

More at the door

Other vendors are likely to enter the X Window market as user interest heats up: International Data Corp. estimated that the potential market for X Window display stations will shoot from 75,000 units next year to 500,000 units by 1991.

Vendors wishing to gain market share must now differentiate their flavor of X Window support. "A vendor opting to build a strategic approach to X Window is going to have to worry much more than its competition," said Michael Mikellson, vice-president and chief technologist at Patricia Seybold's Office Computing Group.

"Competitive distinction then comes when those differentiators are combined with other elements of the total systems offering," he said.

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HARD BITS

Honeywell Bull secures \$3.1M Big Eight order

Honeywell Bull, Inc. reported a \$3.1 million order from Deloitte Haskins & Sells, a Big Eight accounting firm, for 48 Honeywell DPS 6 Plus minicomputers that will be used throughout the company's U.S. administrative offices. The minicomputers will be connected to the firm's DPS 90/91 mainframe.

Alley Computer Products, Inc. recently signed a deal with IBM that will allow it to resell IBM 3151 terminals. The company plans to bundle the display stations with its networking system offering, PC Twin.

Justin Ratner, director of technology at Intel Scientific Computers — a division of Intel Corp. — was recently named an Intel Fellow, the fourth in the company's 20-year history. The new position will allow Ratner to pursue research projects of his own choice. Ratner holds three patents that are related to multiprocessor computer architectures, according to Intel.

Bellcore in Piscataway, N.J., has installed \$1 million worth of EMC Corp. main memory products for its IBM mainframe computers. The EMC products will be

used to boost storage capacity of two IBM 3084s, one 3081 and one 4381.

Data General Corp. is going after the banking market with the help of two marketing alliances. The Westboro, Mass., minicomputer maker teamed up with Broadway & Seymour and Diversified Data Products, Inc., to jointly market branch automation systems based on the DG platform.

NCR Corp. said it won an automated teller machine (ATM) contract with the First American Bank of Georgia in Atlan-

ta. The company said it will be installing 47 ATMs for the \$1.6-million-revenue bank during the next 18 months.

Filenet Corp., which sells imaging systems, signed a deal with Lomas Information Systems, Inc., a subsidiary of Lomas Mortgage U.S.A. in Dallas. The two companies will jointly sell Filenet's imaging system to banks, savings and loan institutions and mortgage companies.

Nicador Computer Corp. said it plans to market the Apollo Computer, Inc. workstations for software development, technical documentation and computer-aided design applications.

Ford Motor Co. recently purchased two supercomputers from Convex Computer Corp. Ford will use the C210 and C120 in engineering analysis applications, Convex said. The minicomputer company also said a C210 was recently purchased by Jaguar Cars Ltd. in Coventry, England.

Sequent Computer Systems, Inc. said it launched a reseller program to help beef up sales. The program is open to any independent software vendor with hardware purchasing and resale experience, Sequent said.

Concurrent Computer Corp. won a \$3 million contract from the German Federal Agency of Air Traffic Control to upgrade the air traffic control system in Karlsruhe, West Germany. Concurrent will provide its Model 3280SP, which was designed for real-time applications, and Ada-based software.

Digital Equipment Corp. signed a development license agreement for its VAXBI technology with Interstate Electronics Corp. in Anaheim, Calif., and Simpact Associates, Inc., in San Diego, Calif. Interstate Electronics plans to incorporate the VAXBI technology into its line of array processors, which were designed to work with the VAX hardware. DEC said VAXBI versions of the Interstate computers should be available in mid-1989. Simpact plans to use the VAXBI technology in the design of a real-time clock module for VAXBI-based systems from DEC.

Xerox Corp. and Wang Laboratories, Inc. signed an agreement that calls for Wang to recommend Xerox printing systems to select customers.

Lockheed Corporation's batch-mode system, MEDCIB, reduced the workload of medical claims auditors and improved their effectiveness by automatically reviewing all claims and identifying the questionable ones for review.

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NEW PRODUCTS —
SOFTWARE**Database management systems**

Natural Language, Inc. has announced Version 3.0 of Nat-

ural Language and the NLI Connector. The software was designed to provide conversational English data access to relational database systems.

Release 3.0 reportedly offers transparent access to distribut-

ed data held in a variety of vendor environments and provides support for Oracle Corp. and Relational Technology, Inc. relational databases.

Pricing for Natural Language ranges from \$5,000 to \$35,000. The NLI Connector is priced from \$10,000 to \$65,000.

Natural Language, 1802 Fifth St., Berkeley, Calif. 94710. 415-841-3628.

Teradata Corp. has announced a mainframe interface that combines Teradata's relational DBC/1012 Database Computer system with IBM's Transaction Processing Facility (TPF) operating system.

Developed jointly with Citibank Corp., the Teradata TPF interface reportedly enables TPF mainframes to access and manipulate data on the

DBC/1012 concurrently with other systems, including the following: IBM VM or MVS, Honeywell Bull, Inc. machines running GCOS8, Unisys Corp. OS1100 mainframes, Digital Equipment Corp. VAX/VMS machines, AT&T 3B2 Unix and Sun Microsystems, Inc. Unix-based workstations.

According to the vendor, pricing for the TPF interface is quoted on a per-contract basis.

Teradata, 12945 Jefferson Blvd., Los Angeles, Calif. 90066. 213-627-8777.

Development tools

ITP Enterprise Software, Inc. has announced a software platform that was designed for developing and maintaining applications for real-time monitoring and control of manufacturing processes.

According to the vendor, Mainstream is an open architecture program that supports Digital Equipment Corp.'s VMS, AT&T's Unix and other operating systems.

Mainstream is priced from \$25,000, according to ITP Enterprise.

ITP Enterprise, 737 Concord Ave., Cambridge, Mass. 02138. 617-266-2600.

Languages

Accucobol, Inc. has released Accucobol-85, a Ryan McFarland Corp. RM Cobol and Digital Equipment Corp. VAX Cobol-compatible compiler for Unix, Xenix, DEC Ultrix, VMS, Microsoft Corp. MS-DOS and IBM PC/DOS environments.

The product features 50,000 line/min compilers and can support more than 16 open files in Unix or Ultrix environments.

Accucobol-85 is priced from \$595 for single-user personal computer systems to \$11,995 for multi-user computers. Runtime systems range in price from \$135 to \$1,000.

Accucobol, Suite 201, 7950 Silverton Ave., San Diego, Calif. 92126. 619-271-7097.

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Applications packages

Information Dimensions. Inc. has entered the image management market with the announcement of Basis/Images, a software package that reportedly enables the storage, retrieval and display of photographic and graphic art images

linked to Basis full-text databases.

Basis/Images consists of two proprietary programs: Gtern, an image-capable communications program, and the UFP Conversion Utility file format processor. Images are captured, processed and stored on Winchester, compact disk/read-only memory and write-once removable drives.

A first-copy license for Gtern is \$300; UFP Conversion Utility licenses cost \$2,500. Basis operates at DEC, IBM, Wang Laboratories, Inc. and Control Data Corp. minicomputers and mainframes. Pricing for first-copy licenses starts at \$15,200.

Information Dimensions, a Battelle subsidiary, 655 Metro Place S., Dublin, Ohio 43017. 800-323-2648.

The production analysis module of the Prism manufacturing, planning and control system is now available from the Marcman Corp.

Prism was developed specifically for process manufacturers and consists of 10 manufacturing and financial management modules, the vendor said. It is native on both the IBM System/38 and the IBM Application Sys-

tem/400 series of minicomputers. The latest module reportedly includes detailed yield, rates, downtime, scrap, waste, efficiency and other functions.

License fees for the production analysis module range from \$12,000 to \$36,500, depending on the hardware platform.

Marcman, 19 Crawford St., Needham, Mass. 02194. 617-449-5510.

Executive Technology Data Systems has released the 1988 versions of its software for reporting W-2 forms. The software is designed to run on IBM Application System/400 and System/34 and 36 machines.

Called the Magnetic Media Reporting Systems, the packages are said to include formatted data-entry screens, editing programs with error-checking capabilities and printing programs. A copying program is also provided to transfer data to disks in an approved government format.

According to the vendor, the Magnetic Media Reporting Systems can be licensed for \$495 each before Dec. 31 and for \$595 after that.

Executive Technology Data Systems, Suite 200, 34405 Twelve Mile Road, Farmington Hills, Mich. 48331. 313-535-6665.

A presentation graphics package for IBM MVS/TSO installations has been announced by Precision Visions, Inc.

Called Picture Plus 2.6, the product allows users to create and modify charts without having to learn a new programming language, the vendor said. Data can be entered from the keyboard or pulled directly from data files for immediate plotting.

Picture Plus 2.6 supports features such as IBM's interactive System Productivity Facility and dynamic file allocation. It permits access to any hard-copy device in the system without leaving the chart-building session.

Picture Plus 2.6 is priced from \$35,000, including documentation, and is reportedly available now.

Precision Visions, 6260 Lookout Road, Boulder, Colo. 80361. 303-530-9000.

Weyerhaeuser Information Systems has announced a version of its Worksmart maintenance management program designed for the IBM Application System/400 series of mid-range computers.

The software reportedly tracks equipment records, work orders, preventive maintenance scheduling and inventory.

The price of the AS/400 version of Worksmart ranges from \$15,000 to \$35,000, depending on system configuration.

Weyerhaeuser, Tacoma, Wash. 98477. 800-654-9347.



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SYSTEMS & SOFTWARE

Primaevra Systems, Inc. has announced enhanced versions of its project management software designed for Digital Equipment Corp. VAX computers.

Primaevra Project Planner Version 3.0 and Primaevra will reportedly be available free of charge to all registered users.

According to the vendor, scheduling and querying capabilities have been increased, and the software also features enhanced resource and planning control. Primaevra supports DEC VMS Version 4.7 and 5.01.

Initial pricing ranges from \$4,000 on the Microvax 2000 to \$30,000 for the VAX 8800 series.

Primaevra Systems, 2 Bals Plaza, Bala Cynwyd, Pa. 19004. 215-667-8600.

DSI Datatrak Systems, Inc. has announced a software system designed for advertising agencies that range from \$20 million to \$1 billion or more in annual sales.

The Datatrak Management System runs on the Hewlett-Packard Co. HP 3000 minicomputer and supports multiple on-line terminals, IBM Personal Computers and compatible systems and Apple Computer, Inc. Macintosh machines, the vendor said. The software can be customized to individual agency styles and will allow users to set up the system by office, department, account, discipline or any other criteria.

Pricing varies based on the size of the agency and the products required.

DSI Datatrak, 10 Sylvan Way, Parsippany, N.J. 07044. 201-267-5990.

Shared Financial Systems, Inc. and **Stratus Computer, Inc.** introduced a networking software tool for retailers that uses the Stratus line of XA 2000 continuous processing systems.

Called Store/Net, the product reportedly provides a single information pipeline for data collection involving point-of-sale activities, financial settlement and reporting. The collected information can then be transferred to the corporate mainframe for integration with other programs or passed to financial institutions for credit card authorization.

Pricing is based on the customer's transaction-throughput requirements.

Shared Financial Systems, Suite 600, 15301 Dallas Pkwy., Dallas, Texas 75248. 214-233-8356.

An enhanced product from **Genesys Software Systems, Inc.** now allows corporations to meet Internal Revenue Service testing requirements when administering employee benefit programs.

The Section 89 Compliance Testing enhancement is part of the Genesys Flexible Benefits System. It runs on IBM 9370 and 4300 series computers and on IBM 30 series mainframes under the MVS or VSE operating systems.

The Flexible Benefits System is priced from \$120,000.

Genesys Software Systems, 5 Branch St., Methuen, Mass. 01844. 617-685-5400.

A Property Management System for the IBM Application System/400 and System/36 families has been announced by **J.D. Edwards & Co.**

Designed for companies with large leased real estate holdings, the package maintains and generates leasing information and provides both detail and summary budget reports.

According to the firm, Property Management System is priced from \$19,000 to \$49,500, depending on system configuration.

J. D. Edwards, 44949 S. Syracuse St., Denver, Colo. 80237. 303-773-5806.

Business Model Systems, Inc. has announced versions of its Miniplan spreadsheet software, which was designed to run on IBM System/36 and 38 minicomputers. The latest releases supplement the IBM Application System/400 version of the product.

Miniplan/36 is priced from \$1,600 to \$2,350; Miniplan/38 costs \$3,500. The price of Miniplan/400 ranges from \$2,350 to \$6,550, depending on system configuration.

Business Model Systems, Suite 304, 700 E. Ogden Ave., Westmont, Ill. 60559. 312-789-9160.

Realworld Corp. is now shipping an AT&T Unix System V version of 11 accounting applications for the Altos Computer Systems Inc. 386 Series 500, 1000 and 2000 computers.

The modules included are invoicing, general ledger, accounts receivable, accounts payable, payroll, inventory control, order entry, purchase order, sales analysis and check reconciliation. Pricing is approximately \$995 per module, with a typical source license fee of \$1,500.

Realworld, P.O. Box 2051, Concord, N.H. 03302. 603-225-1115.

An application processing software system designed for credit approval programs has been introduced by Credit Card Software, Inc.

The Cardpac Application Processing System fully automates the application process for installment loans, mortgages and revolving credit from the prequalification stage to final judgment, the vendor said.

Pricing is approximately \$200,000, depending on configuration requirements.

Credit Card Software, Spectrum Building, 900 Winderley Place, Maitland, Fla. 32751. 407-660-0343.

Oracle Corp. has announced a series of accounting applications packages called Oracle Financials.

The products are currently being

Continued on page 56

INPUT MADE EASY

DS-2000 and 3000: The Affordable Scanners From Chinon.

Chinon's affordable new scanners could change forever the way computers are used. With OCR software you can type in text without retyping it. With ample add-in card DS-2000/3000 you can produce output to an off-the-shelf fax. And with the ability to scan almost any type of graphic image, DS-2000 and 3000 are perfect for desktop publishing.

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shipped to users of Digital Equipment Corp. VAX and Sequent Computer Systems, Inc. computers and will eventually be ported to the same mainframe, mini and microcomputer environments that support the Oracle Relational Database Management system.

The series includes general ledger, payables, purchasing and assets modules.

Pricing varies depending on hardware platform, the company said.

Oracle, 20 Davis Drive, Belmont, Calif. 94002. 415-596-8000.

Synchronics has added a retail bill of materials package to its line of Reservoir-compatible software products.

Designed to supplement the vendor's existing point-of-sale software, the product offers additional inventory capabilities such as serial and lot-number tracking. The software runs under DOS. The Santa Cruz Operation, Inc.'s SCO XENIX 386, Novell, Inc.'s Netware and 3Com Corp. and Allcom Computer Products, Inc. operating environments.

Pricing ranges from \$1,800 to \$4,500, depending on configuration.

Synchronics, Suite 300, 6263 Poplar Ave., Memphis, Tenn. 38119. 901-761-1166.

Information Science, Inc. has announced an IBM Systems Application Architectures-compliant human resource management system (HRMS) for mainframe environments.

Called Saavi, the product reportedly combines a complete set of integrated HRMS applications with SQL and IBM DB2 re-

lational retrieval and natural-language decision-support tools.

Saavi Release 1.0 is priced from \$10,000 to \$410,000.

Information Science, 59 Chestnut Ridge Road, Montvale, N.J. 07645. 201-391-1600.

Harris Corp.'s Video Systems Division has announced three software applications for use with the company's 32-bit WWS workstation.

The Paint, Composition and Titling packages reportedly offer color graphics, cut-and-paste facilities, image compression and magnification, multiple fonts and several other applications.

The packages are priced from \$2,500 and are scheduled to ship in January.

Harris Video Systems Division, 960 Linda Vista Ave., Mountain View, Calif. 94043. 415-969-9100.

Data Design Associates has reconfigured its line of mainframe financial management software to run on IBM Personal Computers and compatibles.

According to the vendor, the entire PC release will allow PC users to download and upload entire files. Scheduled for release in the first quarter of next year, the applications include DDA's general ledger, accounts payable, purchasing, fixed-asset accounting and project-accounting products.

The PC series of DDA mainframe financial software is priced from \$10,000 to \$15,000 per package.

Data Design Associates, 1279 Oakdale Pkwy., Sunnyvale, Calif. 94086. 408-730-0100.

Theta Business Systems has released a purchase order system that runs on Digital Equipment Corp.'s RSX-11M, RT-11 and TSX-Plus operating environments.

The system allows purchase-order entry with an unlimited number of line items, according to the company. A purchase-order history is maintained and may be viewed on screen by either vendor or product categories.

Pricing for the module ranges from \$295 to \$750, depending on system configuration.

The Theta Business Systems, 9947 Commerce Ave., Tujunga, Calif. 91042. 818-352-6058.

Packagedeal, Inc. is now shipping its Support Net Distribution and Financial Accounting Systems software for the IBM Application System/400.

Applications reportedly include billing, inventory, accounts payable, accounts receivable, purchasing, fixed assets, payroll, personnel and general ledger. All systems, which are still available on the IBM System/38, include source code and a one-year warranty.

Modules are priced individually from \$2,850 to \$3,650.

Packagedeal, 6366 Guilford Ave., Indianapolis, Ind. 46220. 800-255-3390.

SDC Software, Inc. has enhanced its purchasing system for IBM System/36 and Application System/400 mid-range computers.

According to the company, the latest release supports multiple organizations and warehouses and maintains virtually unlimited vendors, items and

price quotations. The license fee is set at \$3,500. Source code is included.

SDC Software, No. 8, 400 Hot Springs, Carson City, Nev. 89701. 702-883-9339.

Unisys Corp. has added three products to the series of Management Science America, Inc. financial management software running on Unisys major systems platforms.

The new products include a product tracking system and a parts ordering system for 1100 Unisys users and an accounts receivable system that was designed for the company's sales territories, according to Unisys.

Pricing ranges from \$28,000 to \$110,000, depending on model selected and system configuration.

Unisys, One Unisys Place, Detroit, Mich. 48232. 313-972-7000.

System software

A series of guides for VM installations has been introduced by the Technical Publications Division of the Computer Resources Group.

According to the company, the Information Systems Series is an interlinked set of four manuals and disks that allows for customization of documentation

development system will be incorporated with TI's XDS-1000 personal computer-based development environment and is scheduled to ship January 1.

A complete system will cost approximately \$16,000.

Texas Instruments, Semiconductor Group, P.O. Box 809066, Dallas, Texas 75380. 800-232-3200.

Utilities

Software Research, Inc. has announced the availability of a new version of its Capbook test data-capture and playback package for the Unix operating system.

The Capbook/Unix system consists of six components, according to the company: an interactive menu program; a record-command program for saving responses and timing information in designated files; a program for capturing keystrokes; commands that use files created by record to re-execute terminal sessions; commands that reissue keystrokes; and a utility for converting key-sequence files to a vimble format suitable for editing.

Capbook/Unix has a price tag of \$3,300 for a single CPU license.

Software Research, 625 3rd St., San Francisco, Calif. 94107. 415-957-1441.



VM guides customize IBM documentation

via word processing software or an IBM Personal Computer or compatible.

The set includes "The IS Policy Guide," "The Data Center User Guide," "Systems and Programming Standards" and "The Operations Guide." The complete set costs \$3,495.

Computer Resources Group, 303 Sacramento St., San Francisco, Calif. 94107. 415-398-3535.

A real-time operating system designed for digital signal processing (DSP) has been jointly announced by Texas Instruments, Inc. and Spectrol Microsystems, Inc.

Spectrol is reported to be an application-specific system that will augment high-level programming languages, such as C, with functional components targeted specifically for real-time DSP.

The first Spectrol application de-

A utility that reportedly automatically transfers spool-file entries to remote printers in an IBM Application System/400 environment is now available from Broderick Data Systems.

Called Remote Spoolprint 3.2, the software provides AS/400 printer pass-through capability from an IBM System/36 or 38 minicomputer, the vendor said.

The product is said to allow multiple remote systems as well as multiple devices within each remote system to send, receive and print spool files simultaneously.

Remote Spoolprint 3.2 is priced in the range of \$900 to \$2,400, depending on the hardware configuration chosen by the customer.

Broderick Data Systems, Suite 201, 777 Laver Road, Mansfield, Ohio 44905. 419-589-3336.

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high-speed modem
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its brawn and its
underdeveloped price."**

See us on page 59

Two software products developed specifically for the IBM Series/1 processor have been introduced by CIS Corp.

The Series/C Compiler 2.0 resides on the Series/1 and runs under the EDX operating system.

The compiler includes a resident re-enterant runtime library designed to reduce the size and linkage time of compiled C programs. Series/C Compiler 2.0 is priced from \$5,500.

The company also announced the Series/C language translator, which is reported to be an automated conversion tool for translating EDL source code into structured, readable C source code.

The software is available both as a translation service and as a licensed product; it is priced from \$65,000.

Quantity discounts are available for both products, according to the company.

CIS, P.O. Box 2026, Bloomfield Hills, Mich. 48303. 313-456-0000.

A software utility package that allows interchanges of 2G bytes of backed-up or archived data between different types of CPUs with host-specific adapters has been announced by Summus Computer Systems.

Called the Gigatape Interchange Utility, the product reportedly performs well in combination with helical-scan technology and allows data distribution through cartridge exchange or a network interface.

The software supports machines from Digital Equipment Corp., IBM, Apple Computer, Inc. and Sun Microsystems, Inc. as well as other hardware platforms.

The Gigatape Interchange Utility is priced from \$295.

Summus Computer Systems, P.O. Box 219270, Houston, Texas 77218. 713-492-6611.

Oregon Software, Inc. recently announced its Modula-2 compiler, which was designed for Sun Microsystems, Inc.'s Sun-3 workstation.

According to the vendor, the Modula-2 programs call Pascal, C, C++ and assembler routines, enabling users to take advantage of existing software libraries.

Other features include run-time error handling and an interactive source-level debugger, the vendor said.

The Modula-2 compiler has a price tag of \$2,100 for a single-user license.

Oregon Software, 6915 S.W. Macadam Ave., Portland, Ore. 97219. 503-245-8449.

Beck Computer Systems has released an RMS file editor designed for Digital Equipment Corp. VAX/VMS systems.

Called RMSEDT, the programming productivity tool re-

portedly enables programmers to access, modify, display and print files for virtually all applications running under VAX/VMS. The product is priced from \$995 per site license and varies depending on CPU size.

Beck Computer Systems, 5372 Long Beach Blvd., Long Beach, Calif. 90805. 800-245-1233.

Control Data Corp. recently released a federally validated compiler for Ada that was designed specifically for CDC's Cyber series of mainframe computers.

According to the company, the Ada/VE compiler supports the entire mainframe line under the NOS/V operating system. It includes a program library utility, a linker and a reader library.

The Ada/VE compiler is priced from \$25,000.

CDC, HQW10R, P.O. Box 0, Minneapolis, Minn. 55440. 800-553-2215, ext. 100.

A disk optimization software system for Digital Equipment Corp.'s VAX/VMS Version 5.0 is now available from Software Techniques, Inc.

Diskit 2000 can interface with the VMS distributed lock manager, the vendor said, and can handle all file accesses.

Job monitoring and disk file management facilities are also provided.

Diskit 2000 is priced from \$400 to \$4,800, depending on hardware configuration, according to the company.

Software Techniques, 6600 Kettella Ave., Cypress, Calif. 90630. 714-895-1633.

Computer Associates International, Inc. has released CA-Dynam/B 2.0, the company's IBM VM backup, archival and retrieval system.

The system is said to implement user facilities in order to eliminate disk overload and aid in the tape backup process.

Menu-driven, full-screen command and control facilities are also included, the company said.

CA-Dynam/B 2.0 is available for IBM or compatible VM/SP and VM/HPO operating systems, Version 3.0 or higher. Single-copy license fees range from \$5,490 to \$12,900, according to the vendor.

Computer Associates International, 711 Stewart Ave., Garden City, N.Y. 11530. 516-227-3300.

Intermetrics, Inc. has released Version 2.2 of the Byrone PDL and Document Generator for Digital Equipment Corp. VAX/VMS systems.

The document generator of this Ada PDL supports the generation of DOD-STD-2167 STLDD and SDDD documents in sections, the vendor said.

This feature can also accommodate multiple designers working simultaneously on the same document, according to the company.

Byrone PDL is available on a range of VAX hosts and is priced from \$5,000 to \$35,000, the company said.

Intermetrics, 733 Concord Ave., Cambridge, Mass. 02138. 617-861-1840.

Platinum Technology, Inc. has announced the release of Version 1.4 of RC/Update, the company's productivity-enhancing software designed for information professionals using IBM's DB2 database management package.

The product is said to simplify the task of maintaining DB2 object definitions and now includes an ISPF-like data editor that was designed to manipulate information stored in DB2 tables, the vendor said.

Perpetual license fees for RC/Update average \$17,500, depending on user environment, the company said.

Platinum Technology, 555 Waters Edge Drive, Lombard, Ill. 60148. 312-620-5000.

Polytron Corp. is now shipping a version of its Polymake utility software designed to run in a Digital Equipment Corp. VAX environment.

The software now includes a program that automatically maintains file dependency relationships to make files, the vendor said.

Version 4.4 or higher of the VMS operating system is required, and VMS license holders with update privileges may upgrade free of charge, according to the company.

An SQL-based tool designed for building and managing Oracle Corp.'s Oracle relational databases has been announced by

VAX/VMS versions of Polytron are sold with the Polytron Version Control System on a per-user basis, with pricing starting at \$995, the vendor said.

Polytron, 1700 N.W. 167th Place, Beaverton, Ore. 97006. 800-547-4000.

A utility that allows IBM OS and DOS standard tapes to be read and written from Digital Equipment Corp. VAX machines has been announced by Deltek Systems, Inc.

Called IBMmap, the product writes sequential RMS files on VAX machines from IBM tape and reportedly translates EBCDIC to and from ASCII as necessary, according to the vendor.

Licenses start at \$495 for single CPUs. Corporate licenses are negotiable, the company said.

Deltak Systems, P.O. Box 4452, Winston-Salem, N.C. 27115. 919-777-0099.

Digital Research, Inc. has unveiled a source-level debugger for applications and drivers developed for the company's Flex OS operating system.

According to the vendor, Flexview will help application programmers in three areas: program control at the C source level; window display of program and system status; and debugger knowledge of data types.

Flexview costs \$595. Digital Research, Box DRI, Monterey, Calif. 93942. 408-649-3895.

An SQL-based tool designed for building and managing Oracle Corp.'s Oracle relational databases has been announced by

Design Generation, Inc.

Ultraform 1.3 is composed of three integrated components: Systems Definition and Management, User Reporting and Terminal Control. The system is reported to operate in several vendor environments. The Ultraform 1.3 Unix version costs \$399, the VAX/VMS costs \$899 and the IBM/VM version is priced at \$995. Ultraforms also runs on IBM Personal Computers and compatible systems.

Design Generation, 5129 Johnston Drive, Pleasanton, Calif. 94566. 415-463-2040.

Ivan Software, Inc. has enhanced its full-screen text editor and file librarian software designed for NCVR/VX systems.

The optional feature reportedly allows Ivan-Lily/IvanEdit users to switch between loosely coupled hosts operating systems in multiboot environments. The multiboot enhancement software is priced from \$2,000 for a two-boot installation.

Ivan Software, 973 E. Congress Park Drive, Dayton, Ohio 45459. 513-436-4826.

A software package designed to increase VME throughput by as much as 25% on a Digital Equipment Corp. VAX machine is now available from Touch Technologies, Inc.

The Dynamic Load Balancer 5.0 tuning product is composed with VMS Version 4.0 and higher, the vendor said, and is written in the Basic 32 language. The first CPU license is \$1,995, with additional licenses priced at \$1,595 each.

Touch Technologies, 9990 Mess Rim Road, San Diego, Calif. 92121. 619-455-7404.

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See us on page 59

NEW PRODUCTS — SYSTEMS

Turnkey systems

A fault-tolerant system for Intel Corp. 80386 AT&T Unix System V, Release 3.2 and Xenix Version 2.3 machines has been introduced from **1776, Inc.**

The **Unix Fault Freedoms** reportedly permits 386 Unix systems to be used in applications in which significant downtime and data loss are unacceptable.

The fault-tolerant features are available in several configurations, depending on the level of protection desired. Mirrored disk, redundant subsystem electronics and redundant computers are optional.

Pricing ranges from \$13,850 to \$53,250, depending on storage and options.

1776, 819 N. La Jolla Ave., Los Angeles, Calif. 90046. 818-789-2004.

Processors

Eastman Kodak Co. has announced eight additions to its Kodak Ekstraprint Electronic Publishing System,

The new products consist of a Kodak Ekstraprint 1106 CPU, an Ekstraprint 1100 peripheral server, the 1604/327 desktop file server, a 327X memory disk memory, a 327X memory expansion board, two personal computer boards and PC-NS. Eastman Kodak's proprietary PC network software.

According to the vendor, these offerings will provide improvements in processing speed,

data storage capacity and operator convenience.

Available for immediate delivery, the products range in price from \$450 to \$15,000.

Eastman Kodak, 343 State St., Rochester, N.Y. 14650. 716-724-4000.

Cheshire Engineering Corp. has announced a high-speed shared memory interface for its XP-11 coprocessor that was designed for Digital Equipment Corp.'s PDP-11 computer systems.

The XP-11 is a self-contained 32-bit computer system that runs in the PDP-11 Qbus or Unibus slot. According to the vendor, applications can now run in parallel mode and can share memory to provide high-speed communications.

An XP-11 equipped with 4M bytes of on-board memory and a 64K-byte cache memory sports a price tag of \$11,900.

Cheshire Engineering, Suite 201, 650 Sierra Madre Villa, Pasadena, Calif. 91107. 818-351-5493.

NEC Information Systems, Inc. has introduced the Businessmate 386/20 multilaser system.

Based on the Intel Corp. 80386 32-bit microprocessor, the machine reportedly operates at 20 MHz under the Santa Cruz Operation's SCO Xenix 386 operating system.

Along with the master console, as many as 16 nonintelligent terminals can be connected to the computer.

The Businessmate 386/20 base unit with 2 MB bytes of random-access memory, a 1.2-Mbyte floppy disk drive and a 42MB-hard disk drive costs \$6,795.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719. 508-635-4400.

I/O devices

General Business Technology, Inc. has announced a high-volume page printer that attaches to IBM's Application System/400 and System/36 or 38 via twin-axis cable.

Designated the **GBT 6624XP**, the 24 page/min



General Business Technology's 6624XP page printer

printer offers a 300 by 300 dot/in. resolution and includes 35 fonts, according to the vendor. Two standard input cassettes are provided with 550-sheet and 250-sheet capacities.

The price tag costs \$14,995.

General Business Technology, 1891 McGaw Ave., Irvine, Calif. 92714. 714-261-1891.

A 600 dpi/in. plain-paper image setter has been announced by **Compragraphics Corp.**

The CG 610 is a tabletop unit that offers electronic publishers exact-copy, full-page proofing with precisely positioned text and graphics, the vendor said.

The product is targeted at both corporate and commercial environments and will reportedly connect directly to any Compragraphics Integrator Series workstation.

Scheduled for January shipment, the CG 610 will cost \$11,995.

Compragraphics, 200 Ballardvale St., Wilmington, Mass. 01887. 508-658-5600.

matrix frame that surrounds the computer screen to create a grid of invisible light beams in front of the display's surface.

The Scanning Infrared Touch add-on packages are available at a cost of \$445 in quantities of 100.

Carroll Touch, P.O. Box 1309, Round Rock, Texas 78680. 512-244-3500.

Digital Equipment Corp. has announced the availability of a bar-code font cartridge for the company's LNO3 line of laser printers.

Called the **LNO3X-DE**, the cartridge reportedly produces all 43 characters of industry standard Code 39.

LNO3X-DE costs \$299. DEC, 146 Main St., Maynard, Mass. 01754. 508-493-5111.

Curtis Manufacturing Co. has introduced an anti-glare filter, an all-glass filter for computer monitors that reportedly reduces glare by 95%.

The product, which is available in seven different sizes with Velcro fasteners, is priced at \$59.95.

Curtis Manufacturing, 30 Fitzgerald Drive, Jeffrey, N.H. 03452. 603-532-4123.

Decision Data Computer Corp. has announced two matrix printers designed to offer full intelligent Printer Data Stream support when attached to an IBM System/36, 38 or Application System/400 minicomputer.

Designated the **6524-41** and the **6524-61**, the printers feature IBM 4224 emulation capability with speeds up to 400 char./sec., according to the company.

The 6524-41 includes 512K bytes of expanded memory and carries a price tag of \$5,300.

The 6524-61, with 64K bytes of standard memory, is priced at \$4,950.

Decision Data, 400 Horsham Road, Horsham, Pa. 19044. 215-956-5728.



Decision Data's 6524

A printer controller that reportedly allows laser printers to output at speeds of up to 60 page/min. of text and graphics was recently announced by **Advanced Technologies International, Inc.**

Targeted at such industries as law, insurance, finance and computerized design, the LC-6000 will run on a variety of systems, the vendor said.

**"We tell
all our customers
about the economical
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because it's the best
value around."**

See us on page 59

The controller is priced at \$10,500. Advanced Technologies, 355 Sinclair, Frontage Road, Milpitas, Calif. 95035, 408-942-1780.

Informer Computer Terminals, Inc. has announced a series of IBM-compatible portable display systems with color capabilities. The units are available for dial-up networking applications, the company said, and incorporate a fast 60-col. by 24- or 32-line display.

The Model 209 series also features a 9-in. color monitor and built-in IBM 3270 emulation capabilities. It costs \$2,600.

Informer Computer Terminals, P.O. Box 3280, Garden Grove, Calif. 92642, 714-891-1112.



C. Itoh Electronics, Inc. has announced the availability of a monochrome graphics terminal.

According to the company, the CIT328 provides Tektronix, Inc. 4010 and 4014 vector graphics emulation for Digital Equipment Corp.'s VT320 users. Other emulations reportedly include VT52, VT100 and VT220, and the product features up to four pages of 24- or 25-line text memory.

The CIT328 costs \$699.

C. Itoh Electronics, 2505 McCabe Way, Irvine, Calif. 92714, 714-660-1421.

QMS, Inc. has unveiled the QMS Smartwriter 150 laser printer.

The device supports Digital Equipment Corp.'s LNO3, LNO3 Plus and Hewlett-Packard Co. LaserJet Plus emulations, according to the vendor.

Scheduled for January shipment, the printer is based on a Ricoh Corp. 4150 print engine and offers a 15,000 page/month duty cycle.

The QMS Smartwriter 150 costs \$4,995.

QMS, 1 Magnum Pass, Mobile, Ala. 36618, 205-633-4300.

Applied Digital Data Systems, Inc. has announced the availability of two terminals that were developed specifically for use in a Digital Equipment Corp. environment.

Designated the 3320 and the 3320 Touch, the former is said to be a compatible enhancement to the DEC VT320, while the latter reportedly offers identical features as well as a touch-screen user interface.

Other enhancements include a 25th display line, which can be used to provide the operator with a row of column information, printer status indication or host messages.

The 3320 terminal is priced at \$695; the 3320 Touch model sports a price of \$1,595.

Applied Digital Data Systems, Inc., Marcus Blvd., Hauppauge, N.Y. 11788, 516-231-5400.

Ideasassociates, Inc. has enhanced its Idea 197 line of IBM mid-range terminals to provide full Application System/400 compatibility, the company said.

The enhanced products are said to feature direct support for ASCII serial input devices such as bar-code scanners and magnetic strip readers. Both serial and parallel ports are included, as well as a memory driver utility for customizing printer drivers to specific applications, the company said.

Prices range from \$1,195 to \$1,495.

Ideasassociates, 29 Dunham Road, Billerica, Mass. 01821, 508-663-6878.

Image Data Corp. has upgraded the company's Photophone videophone product to allow users to send and receive

messages at a rate 30% faster than was previously possible.

Picture transmission time has reportedly been reduced from 10 to 2 sec., the vendor said. The desktop workstation can be linked to any size video monitor for presentations and is based on an Intel Corp. 80286 microprocessor, according to the vendor. A 14.4K bit/sec. modem is included.

The Photophone costs \$9,445. An optional 12-in. monochrome monitor costs \$699.

Image Data, 11550 IH-10 West, San Antonio, Texas 78230, 512-641-8340.

Numonics Corp. has announced a 90-day replacement policy for its Series 5000 plotters.

According to the new policy, the company will replace any plotter experiencing hardware problems within a 90-day period, and, if required, a replacement plotter will be sent by air courier.

The Series 5000 plotters range from \$2,495 for the single-pen model to \$3,195 for the eight-pen model.

Numonics, 101 Commerce Drive, Montgomeryville, Pa. 18936, 800-247-4517.

DATA STORAGE

A two-drive removable disk subsystem designed for Sun Microsystems, Inc.'s Sun-2, Sun-3, Sun-4 and 386i computers has been announced by **Emulex Corp.**

According to the vendor, the SN-

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(303) 777-6311

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(404) 299-0902

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Interim

(800) 626-4708

Illinois

Commercial Resources Corporation

(312) 281-3630

Massachusetts

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Commercial Resources

(800) 343-8000

North Carolina

Charlotte
Systech Express Corporation

(704) 556-9950

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Circusnet

Concord
Giga Communications

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Cleveland
TEC Communications

(216) 415-9601

Oregon

Portland
Digital Controls Corporation

(503) 415-5455

Michigan

Grand Rapids
J.B. M. Data Communications
(619) 957-2242

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(313) 465-6175

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Eden Prairie
Centronics DPE Co., Inc.

(612) 942-2830

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Information Products, Inc.

(816) 373-9430

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Englewood
Datacom

(201) 566-2353

Englewood

Electro-Reg

(313) 222-1966

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(214) 363-3838

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Salt Lake City
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(800) 367-2782

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Chesapeake
Advanced Communications Tech.

(404) 422-4940

Seattle

Data Communications Systems Corp.

(206) 471-0891

Virginia

Gloucester Components

(703) 734-9867

Washington

Kirkland
Ray-Sac Corporation

(206) 821-4552



Authorized Distributor

ER2S provides storage capacity up to 1.3G bytes. The unit attaches through the Sun small computer systems interface port and utilizes a proprietary, Sun-compatible disk controller.

The subsystem is available in both rack-mount and desktop configurations, and pricing ranges from \$5,970 to \$10,120.

Emulex, P.O. Box 6725, Costa Mesa, Calif. 92626. 714-662-5600.

EMC Corp. has announced that it is now shipping add-on memory for Hewlett-Packard Co.'s Spectrum series systems.

The product is compatible with the high-end models of the Spectrum series, including the HP 850 and the HP 955, and will also run with HP's 850 and 855 Unix-based machines.

The memory, designated **HXP-716M**, is available in a 16Mb-type board and is priced at \$32,000.

EMC, 171 South St., Hopkinton, Mass. 01748. 800-222-3622.

Emulex Corp. has introduced a removable disk subsystem for Digital Equipment Corp.'s Unibus-based VAX and PDP-11 minicomputers.

The **ER2E/J** is said to be an enhanced small device interface-removable subsystem that offers up to 1.3G bytes of formatted capacity. The product includes an intelligent on-board microprocessor to monitor subsystem conditions and drive activity.

The **ER2E/J** is priced from \$7,130 to \$11,390, depending on configuration.

Emulex, P.O. Box 6725, Costa Mesa, Calif. 92626. 800-368-5393.

An 8mm helical-scan tape subsystem was recently introduced by **Transitional Technology, Inc.**

The **CTS-8000** includes an activity display panel and a differential small computer systems interface long-line option, which reportedly allows up to 80 feet of distance between the drive and host, according to the vendor.

The subsystem works with standard Digital Equipment Corp. device drivers and is compatible with Unibus and DEC's Q-bus, the vendor said.

The price tag for a single unit is \$7,495.

Transitional Technology, Suite 203, 1411 N. Batavia, Orange, Calif. 92667. 714-744-1030.

IPL Systems, Inc. has introduced its **6860 Tape Subsystem**, a high-density cartridge tape back-up system that was designed for the IBM System/38, 4300 and 9370 processors.

The unit reportedly permits up to 2.3G bytes of data storage on an 8mm tape cartridge and utilizes helical-scan technology.

The product is scheduled to ship next month, and a basic configuration will cost approximately \$18,895, according to the company.

IPL, 366 Second Ave., Waltham, Mass. 02154. 617-890-6620.

Voltage Monitor Interrupter is priced at \$329.95.

Electronics Specialists, 171 S. Main St., Natick, Mass. 01760. 800-225-4876.



AC interrupter has automatic reset

Clary Corp. has unveiled an uninterrupted power supply (UPS) system designed for the IBM Application System/400 line of mid-range computers.

The **Onguard Series 400** will support up to two typically configured 9309 racks, a terminal and a modem, according to the vendor. The product uses the same wall connection as the AS/400, and no additional electrical wiring is required for installation. It is available in tap-selectable inputs of 208, 220, 230, 240 or 250 VAC/50 Hz or 60 Hz.

The Onguard Series 400 UPS is priced at \$7,190 for a base single-module configuration.

Clary, 320 W. Clary Ave., San Gabriel, Calif. 91776. 818-287-6111.

Power supplies

Electronic Specialists, Inc. has enhanced its line of AC power interrupters to include automatic reset models with integral reset delay, according to the company.

The units are said to be designed for computer installations that must operate uninterrupted for lengthy periods of time.

The **Model PI-SR-15 Self-Reset Interrupter** costs \$296.95, and the **Model PI-SRV-15 Self-Reset** and

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BIM-REPORT — Reports generated by BIM-POOL can be printed on 3270 terminal printers.

BIM-SCREEN — On-Line or Batch Print Screening. Prints screens from CICS application programs into the POWER spooling queue.

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BIM-MADE — Automatically alters or deletes DOS/OS/POWER job entries.

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BIM-BUFF — Significantly increases the performance of VSAM under DOS by dynamically managing VSAM buffers.

BIM-TEXT — Converts binary data into ASCII text file system. Creates formatted logons from free-form input. DOS and OS.

BIM-WAR — Switch local 3270 BTAM terminals between multiple CICS regions without having to log off or additional ports.

BIM-SPRS — CICS 3270 terminal connection. Reduces response time for remote terminals significantly. DOS and OS.

BIM-TERM — CICS Session on-line map generation and management. DOS and OS.

BIM-COHO — Copies one CRT's output to another or printer for problem determination and demonstration. DOS and OS.

BIM-PRINT — Comprehensive CRT and image printability.

COPY — Copy to printer or printer output queue or printer DOS and OS.

BIM-DSRY — On-line display of library directories and entries. VSAM Catalog entries, das, VTAC's, etc.

BIM-COM — CICS Command Language System Console function for CICS. Display-only or full input/display versions available.

BIM-MONTR — DOS/VSE System Status, Performance Measurement, and POWER Queue display.

BIM-CON — On-line Job Edit and Submission facility.

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The Lowe-back. A while back, *The Wall Street Journal* kept trying to run a story about IBM and IBM kept making them pull it. The story essentially was that IBM was planning to introduce an Intel 80386 machine that used the old AT bus. This, according to some IBMers, was a form of personal computer heresy that would never be allowed.

The *Journal* had apparently talked to a high-level executive who gave them the information, but higher level executives stepped in to squash the story.

It eventually ran, but IBM still maintained that it made little sense to produce a 32-bit machine (with the 80386) with a 16-bit bus (the AT bus). We looked into the situation and were satisfied that IBM indeed planned such a machine — but with a twist.

After cornering IBM Entry Systems Division chief Bill Lowe, the mystery was solved once and for all. In so many other situations, the problem stemmed from IBM's incredibly careful use of the English language. IBMers were saying there would be no 386 chip be-

Continued on page 70

A/UX missing Mac bandwagon

BY JULIE PITTA
CH STAFF

CUPERTINO, Calif. — Technical users are making the most of Apple Computer, Inc.'s Macintosh despite the slow acceptance of A/UX, the company's version of Unix.

A/UX began shipping in January, almost six months later than originally scheduled. In this instance, the product did not prove to be worth the wait, because A/UX did not coexist harmoniously with the user-friendly Macintosh operating system. To move from one environment to

the other, a user must reboot the system.

"A/UX is a very vanilla version of Unix. There's nothing exotic about it," said Alan E. Holley, principal consultant for engineering computing at Hughes Aircraft Co.'s Ground Systems Group. "If you use a Macintosh with Unix, it's as though you're not using the Mac at all. You don't get any of its capabilities."

Unix at A/UX no

Although the Ground Systems Group boasts about 5,000 Macintoshes, few of them run

A/UX. For applications such as computer-aided software engineering, Hughes has opted for Sun Microsystems, Inc. workstations running Unix.

Jeff Erlich, MIS director for General Electric Co.'s Medical Services group, said engineers within his organization have also opted for Sun workstations for design purposes. Like Holley, he complained that A/UX does not allow users to switch easily between the Mac and Unix environments. However, Erlich has been responsible for bringing a large

Continued on page 75

SPOC flies on shuttle

BY MICHAEL ALEXANDER
CH STAFF

When the space shuttle *Atlantis* lifts off later this month, it will be carrying SPOC — not the pointy-eared alien from *Star Trek* but a laptop computer made by Grid Systems Corp. in Fremont, Calif.

Two Grid Compass models, which the National Aeronautics and Space Administration calls the Shuttle Portable On-Board

Continued on page 73

Dataease aims for DBMS limelight

BY DOUGLAS BARNEY
CH STAFF

TRUMBULL, Conn. — For one of the leading personal computer database management systems

vendors, Dataease International, Inc. has an exceedingly low profile. With the release of the \$700 Dataease 4.0 and aggressive plans to offer the product as a front end to popular database

servers, the company may capture wider attention.

Dataease, with some \$13 million in sales during the last calendar year, has been successful in developing a customer base that includes Security Pacific Corp., Mobil Oil Corp., Chrysler Corp., and Ford Motor Co. The firm reportedly shipped 50,000 copies last year.

Unlike programs such as Ashton-Tate Corp.'s DBase, which is centered around procedural languages, Dataease is almost completely menu-driven. According to company Chairman Arun Gupta, the product's ease of use has let some 200 Fortune 500 companies to use the product. A typical scenario, Gupta said, is for an IT user to start work on an application. As it nears completion, MIS professionals are called in to add security features

and controls for data. "We promote cooperative application development," Gupta said.

Dataease 4.0, which is reportedly compatible with previous versions, adds enhancements to its query language that is said to be similar to IBM's SQL. This language includes 18 new commands for programmable logic, global and local variables, custom-error messages and subroutines and I/O statements.

Continued on page 73

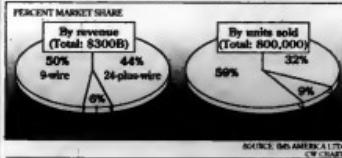
Inside

- * King Kong Bundy explains the PC Checklist. Page 63.
- * Now you see a rabbit; now you see a software package. Page 63.
- * Project Workbench release pleases users. Page 63.
- * VIA aims at Fortune 1,000 DBMS market. Page 66.

Data View

Dot matrix printer profile

Sales into computer specialty stores during the first half of this year that sold machines are the most popular



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MICRO BITS
Julie Pitta

Mixed grades for Apple

Apple is listening to corporate users. There is no greater indication of that than the actions taken in 1988, dubbed by Chairman and Chief Executive Officer John Sculley as the Year of Networking for Apple.

What Sculley and other executives at Apple realize is that the company needs more than a nifty graphical user interface and other gee-whiz technology to penetrate large corporations. For years, many of these companies have been purchasing large numbers of dull — but functional — IBM 3270 terminals.

What Apple needs to demonstrate is the ability to connect Macintoshes into complex multi-tiered environments, and, most importantly, to IBM mainframes.

In the last year, Apple has made an average of one networking announcement per month. Apple's corporate customers are encouraged by the effort. Others who have dismissed Apple in the past are taking a second look. Everyone agrees that while Apple has gone far, it has further to go.

Continued on page 70

Bundy bashes Mac, OS/2 and Hulkster

IN PERSON

Read a typical story about a new product or technology, and what you find is Quotable from one analyst, customer and vendor all predicting the fate of this or that.

Wanting more, Computerworld has always sought out the opinions of the most powerful figures in the business. We may have just found the most powerful personal computer figure ever.

King Kong Bundy, the 425-pound professional wrestler with two little hair to keep an ant warm, is a PC convert. The keyboard-and-head-pounding Bundy is now a spokesperson for Vendex Computers, which has been trying to convince people that its PCs are easy to use. The message is, if Bundy can use it, anyone can.

And while Bundy has helped sell the machines to U.S. buyers, Vendex is also making inroads in the business market. In fact, the New York Mercantile Exchange will purchase 200 Vendex Headstart PCs for its brokers. According to sources, Bundy's arm-twisting had little to do with sealing down the contract. With new high-end machines on the way, Bundy is taking clear aim at the corporate market.

Despite the image that some



Bundy in his glory

people have of bald, muscle-bound men prone to violence, Bundy is far from dumb. He has a

quick wit and an inventive imagination.

He also has clear opinions about the PC business that offer a refreshingly impartial view vendor type, analysts' insights and customer reactions. Who better to pontificate on the issues confronting the PC industry than a man of Bundy's stature? Who, indeed?

Senior Editor Douglas Barney recently spoke with Bundy to get the professional wrestler's view of the PC business and his thoughts about the competition, the PC and wrestling arenas.

Why did Vendex hire you to represent their computers?

They wanted to show the mass appeal of the Vendex Headstart

Continued on page 68

Software helps with creating magic ideas

BY KEVIN BURDEN
OF STAFF

If you think all the illusions magicians create are the result of only their own sheer mindpower, think again.

Daryl, a magician based in Southern California, confesses: "Yes, occasionally I do use the help of software." The package that Daryl admits to using is a brainstorming program called Idea Generator by Experience in

Software, Inc., which he runs on his IBM Personal Computer AT compatible. The program is designed to boost both creative thinking and the problem-solving skills that we all possess, no matter how deeply hidden they may be. A magician's creativity is his livelihood, so any help from any source — including computers — is welcome.

Although Daryl (he does not use a last name) has only been using the program for a couple of months, he said he has generated more ideas than he could have on his own. "Magicians must look at everything in a different way; it's only in this perspective that we could come up with the deception," Daryl said.

Three sections

The program is separated into three sections. The first section probes the user to define his problem, list his goals in order of importance and name the people involved. The second section is where the idea generation takes place. The product uses seven techniques, each one supplying template questions to help users view the situation from a different angle. The last section lets

users take a step backward and evaluate newly generated ideas.

Being a secretive lot by nature, collaboration is not something magicians are likely to do. But the computer may change all that. Other Perspectives is a feature that allows users to discover what others would do in a particular situation. The system asks questions such as, "What is it about this person's opinion you respect?" and "How would this person handle the situation?" Using this technique, users can create anyone they choose, either living or dead. This is the perfect opportunity for a magician to find out what the audience or other magicians may

Continued on page 75

Users prefer a sturdy Workbench

BY MICHAEL BALL
OF STAFF

NEW YORK — An industrial-strength project management tool is how users describe Applied Business Technology Corp.'s (ABT) Project Workbench Advanced System Release 3.0.

Careful users of the personal computer package may be overwhelmed by its enhanced feature set, but those shepherding large or complex projects claim Release 3.0 represents a big improvement.

"It is a very rich system now," said Ross Brubaker, manager of product strategy at IBM's Systems Integration Division in San Francisco. As have many other users, he has been through several versions of Project Workbench and has had a hand in shaping the features of the latest release.

ABT "put in a lot of things that suit the way we work," Brubaker said.

Project Workbench, Advanced System Release 3.0

Price: \$1,275

- Provides resource tracking for single or multiple projects
- Compatible with DOS III
- Requires 512K bytes RAM

ers for beta testing. Brubaker reported that most of them were very pleased, particularly with the product's expanded tracking and reporting capabilities. Those who were not were managers with the smallest projects; they fell back no simpler programs.

At financial services company Paine Webber, Inc. in Weehaw-

ken, N.J., Brian Gonzalez said his users were similarly pleased. "The new scheduling, tracking, built-in time sheet and improved resources management were very useful," he said. His 100 project managers in an 800-person MIS staff have 30 to 50 project workers at a time. One of Gonzalez's duties as quality assurance manager is to support and implement their software.

A particular hit with Paine Webber users is more flexible tracking of human resources. The new release allows allocating different times per day, week or month. "ABT has added a little bit of reality that reflects the way people work," Gonzales said. "If you can work three days a week this month but only two days on the project next month, Project Workbench can do that. This is very important in simulation or forecasting."

He added that other software he has used lets people create great plans, which they then

have to shelf while they get down to the real work of project management. With a much larger number and more types of variables in planning and tracking, "you can constantly revise your assumptions, not just work off an average," he said.

Users also differentiate the

new release by its ability to reinforce good habits, much like a structured programming language. A smart person can override it, but Project Workbench prompts users for resources needed and project start and end dates. "It does not inhibit

Continued on page 66

Top sellers

Software: Oct. 31-Nov. 4

Lotus' 1-2-3

Path Generation Systems' Fastback Plus

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Microsoft's Word for the Macintosh

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We applaud the efforts of the CCITT as they move toward their goal of creating international standards for computer communications. From their adoption of the present X.25 standard to their recent recognition of the V.42 protocol with LAPM as the international standard for error-control over dial-up telephone lines.

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*There will be a minimal charge of \$50 for either an X.25 or V.42 upgrade on products purchased prior to or on September 30, 1988. Products purchased after September 1988 will include either standard as they become available.

Go ask Lotus' CD-ROM system

BY DOUGLAS BARNEY
CP STAFF

CAMBRIDGE, Mass. — Some personal computer support people get tired of poring through manuals to find answers to technical questions posed by end users. They are probably also tired of waiting on hold while the vendor tries to solve a problem. And no doubt they are frustrated by the complexities of distributing something as simple as an updated device driver.

As a spreadsheet vendor with millions of users, Lotus Development Corp. understands these problems. That is pre-

cisely why Lotus last week announced Prompt CD, a compact disk/read-only memory (CD-ROM) system that includes some 2,600 technical support notes, online versions of *Lotus Magazine*, evaluation and demonstration versions of software, add-in programs, product upgrade information and Lotus press releases.

The \$995 product is updated monthly and is aimed at MIS professionals, information center managers and micro managers who support large numbers of users. A CD-ROM player must be purchased separately.

According to Lotus, the product will be sold directly to the firm's largest ac-

counts. In most of these accounts, support personnel handle questions from end users and call the vendor only for the toughest of problems. Lotus said it receives a connected total of 50 to 55 calls per day from its largest customers.

Prompt CD is aimed at making the job of answering technical support easier. It includes answers to technical questions for all Lotus products, and the firm plans to add 100 new technical notes with each monthly update. The disks also have technical information on products no longer available, such as 1-2-3 Release 1A.

In addition to technical information, Prompt CD includes evaluation versions of new products such as Lotus' Agenda. An almost-full version of Agenda is found in Prompt CD, with which a user can cre-

ate — but not save — a database. Demonstrations of other products, such as the Freelance graphics program, are included but are not working copies. In addition, users can upload product fixes and can even load macros found in *Lotus Magazine* articles.

Besides the monthly updates, many users will gather a stack of stable CD-ROM disks. Under terms of the licensing agreement, these disks can be distributed to others in the organization.

The product is set to ship in January and is currently in the latter phases of beta testing at Lotus customer sites. Volume discounts are available.

So far, Lotus is selling only a small portion of the 500M-byte disk. Company officials hinted of more to come.

Workbench

CONTINUED FROM PAGE 63

you, but you are forewarned," noted Nick Lundi, advisory systems engineer at GTE Data Services Inc., in Temple Terrace, Fla.

GTE also appreciates the ability of its project groups to do virtually all planning on stand-alone PCs without taking up expensive mainframe resources. Unlike many other users, it has written its own PC-to-mainframe interface for the package and plugs project estimates into larger systems. "We want to use our host as a database for the various projects and have the simulation and all the changes done on PCs," Lundi said.



ABT's Project Workbench

This method also eliminates one of Release 3.0's weakest aspects — reporting. GTE takes the Addison-Tate Corp. Disease-compile files and imports them to its reporting system. In contrast, while Paul Weibert would like additional reporting formats, it has not yet developed a corporate solution. "Our people can take a file and massage it further, but so far we have been content with what we have and do not want to make users go beyond what they do already," Gonzales said.

Gonzales added that keeping the project management package easy to use is key in his job. He said its Lotus Development Corp. 1-2-3-like interface is easy for his people to relate to in their design of large-scale mainframe systems. "We've looked at other project management software," he said, "but I have to live with people. I can't just give them something and leave."

As have other users, he noted that ABT helps two ways here. "They are always headed in the right direction in their enhancements," Gonzales said. "but beyond listening to us about what we want in the product, they are there for support. They have been very responsive whenever I have called and have never failed us when a user had a problem."

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Via prettifies its DBMS server

BY ROBERT MORAN
CW STAFF

PRINCETON, N.J. — Via Information Systems Corp. has enhanced its database management systems server to vie for the attention of Fortune 1,000 corporations that are now leaning toward distributing database management systems.

The new features flesh out the company's Via/DRE, which had offered peer-to-peer communications under IBM's OS/2 and Microsoft Corp.'s MS-DOS and the ability to perform transparent multipoint joins between CCITT's X.25-based local-area networks. The features, however,

lacked SQL support, database administration utilities, password protection and the ability to interactively create windows, pages and fields.

With Release 1.2 of Via/DRE, the company now offers three types of SQL support, which users can access through menu-driven commands. Via/DRE's embedded Level 1 ANSI-standard SQL language facility, with Level 2 extensions, can be used with standard C programs or with programs developed using VIA/Cool, the company's object-oriented programming language.

The company's interactive SQL allows users at terminals or workstations to di-

rectly query the database.

In addition, the company offers what it calls modular SQL, which allows users to develop, compile and then store SQL routines and queries that can be executed by either a program or a programmer from a workstation.

What's your password?

Via/DRE now offers password control, a prerequisite for guarding database access in Fortune 1,000 corporations, and Via/DBA, a database administration utility that helps the database administrator stage and manipulate data on a network.

In addition, a feature known as Unique Keys allows users to define a key to execute a specific function. Part of the DBMS, called Feature, for example,

serves the applications from having to keep track of customer numbers, which are assigned sequentially in a transaction and stand the chance of being duplicated, spoiling the integrity of the database. In addition, Via offers Via/Print, a utility for interactively creating windows, pages and fields.

Via/DRE, however, does not offer transaction control, which ensures that either a transaction is completed before it is posted or rolled back to the state before the transaction. According to P. E. Borowitz, president of Via, the utility will become available in an early release by the end of 1989.

The enhancements have not increased pricing — \$3,500 per server and \$1,395 for Via/Cool.

NET WORK PEOPLE

Classic drive's mirror backup is clutch

BY WILLIAM BRANDEL
CW STAFF

CLEVELAND — Cumulus Corp. is set to release a removable hard disk drive with shadowing and mirroring capabilities next month.

The unit also includes a package of software utilities to bring data security to the personal computer user.

The 44M-byte system, called Classic, includes a half-height 5½-in. Winchester drive, available in internal and external configurations. The system can back up a 40M-byte hard disk in about five minutes and also includes a mirroring component that saves working files in progress.

Mirror, mirror

Mirroring provides a duplicate disk function that copies every operation to the primary hard disk. If the main disk crashes, the backup takes over without disrupting the user's work. Classic can also be configured to back up at specified intervals and by a variety of file and data characteristics.

The software was designed so that an entire disk can be backed up with two key-strokes, officials at the Cleveland-based company said.

Cumulus President Marty Alpert said Classic also offers a higher level of security to the user than tape backup because it restores the entire PC system, not just files. He acknowledged that when optical read/write technology's price/performance gets up to speed, magnetic disk backup will become obsolete. But until then, he pointed out, Classic can back up more than 40M bytes of data with an average seek time of 25 msec for \$1,295. Optional small computer systems interface or IBM Micro Channel Architecture controllers can be purchased for \$149 each.

Alpert added that by offering the product in a removable configuration, Cumulus can keep manufacturing costs, and thus the product's price, down. Cumulus uses this technique in contrast to encasing an entire 3½-in. head and disk assembly with the Winchester, which drives up manufacturing costs and product price substantially.

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Pitta

CONTINUED FROM PAGE 63

* **Local-area networking.** Apple receives an above-average grade on its report card. Network for the Mac, a product developed by Novell, which allows a Mac to connect to personal computer-based local-area networks while retaining its own unique qualities, was one important announcement. Novell is considered the leader in the PC-LAN technology that gives Apple access to a large installed base of LANs.

Not to be left out, 3Com said it will support the Apple File Protocol in future versions of 3+ Open. Sculley said that Apple will embrace third-party

products that allow the Mac to maintain its unique qualities when connected to other environments.

Appleshare, a dedicated file server for Apple's LocalTalk network, stumbles along. It is apparent that few corporate customers want to use a Mac as a file server when a cheaper IBM Personal Computer AT clone will do the trick.

According to market research firm Infonetics, 11% of all PCs connected in LANs in 1987 were Macs. By 1991, 24% of PCs in LANs will be Macs, thanks to the likes of Novell, 3Com and Sun Microsystems subsidiary Tops, which also offers a product that allows Macs to be connected into a multivendor LAN.

Still missing is Apple's Token-Ring card. Technical difficulties have reported-

ly delayed this product, which Apple has said will be introduced before year's end.

- **Mac-to-IBM mainframe.** Fair. Apple has laid a lot of groundwork, but a lot of work remains. Most promising among the products introduced last year is Macworkstation, a software tool that allows developers to build Mac-like front ends to mainframe applications. Macworkstation can be used with any larger system but seems especially suited to solve the problems of Mac-to-IBM mainframe connectivity. A number of Apple's corporate customers have licensed the product, but so far, few actual applications have resulted. Also, no mainframe software developers have yet announced products based on Macworkstation.

Apple is supporting two of the most

commonly used protocols in multivendor connectivity. Through its third-party developer Touch Communications, Apple is supporting Open Systems Interconnect (OSI), which is expected to eventually replace Transmission Control Protocol/Internet Protocol (TCP/IP) in multivendor environments. Touch has introduced an OSI developer's tool kit. Apple also supported TCP/IP with Mac TCP, introduced in September as a tool for third-party developers. Mac APPC, also launched earlier this year, is a developer's tool that allows program-to-program interfacing between Mac and IBM environments.

The acquisition of Orion Network Systems, a leading developer of IBM Systems Network Architecture software, has Apple investing heavily in Mac-to-IBM networking and heading in a direction some have said is a long time coming — introducing its own products rather than relying so heavily on third parties. • **Mac-to-DEC VAX.** Coming. Apple kicked off the year with the announcement of its new partnership with DEC. Since then, many have been left wondering what will become of the liaison. It seems that DEC has not abandoned its dreams of being a successful supplier of desktop systems, and Apple is squeamish about introducing Mac-to-VAX connectivity products that could alienate third parties successfully in that arena. This may be more a publicity play than a joint development agreement. What will happen? Both parties will likely endorse certain products and technologies to connect their two products.

Apple acquired Network Innovations, a developer of an SQL-based language for Mac-to-VAX connectivity.

After a year of frenzied activity, Nina Burns, a vice-president at Infonetics, gives Apple a mixed report card.

Pitta is Computerworld's West Coast senior correspondent.

Micrografx offers tool for porting

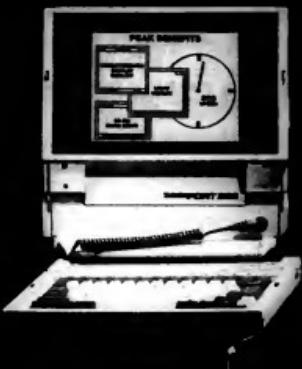
RICHARDSON, Texas — Windowing software pioneer Micrografx, Inc. has announced Mirrors, a set of tools that will reportedly ease the porting of Microsoft Corp. Windows applications to the OS/2 Presentation Manager.

The technology, originally developed to port Micrografx's three Windows applications, Designer, Graph Plus and Draw Plus to OS/2, will be licensed to software developers and internal corporate developers. Pricing will be set on a case-by-case basis.

The product, technically called the Micrografx Windows Emulation Libraries for the OS/2 Presentation Manager, should help boost the release of Presentation Manager applications.

Mirrors is essentially a set of so-called dynamic-link libraries or portions of code that are portable from application to application. These libraries duplicate Windows function calls and map them to their counterparts in the Presentation Manager. Some simple applications will port with no source-code changes. Others, however, will require changes because of certain program dependencies on Microsoft's MS-DOS.

ALL TERRAIN VEHICLE.



ZENITH'S BATTERY-POWERED 386 PORTABLE WORKS AS WELL ON A MOUNTaintop AS IT DOES ON A DESKTOP.

ZENITH data
systems

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SPOC

FROM PAGE 61

Computer, or SPOC, will be used primarily to let the crew know where the shuttle is in relation to the Earth and apprise them of upcoming activities in flight.

The portable laptop, chosen by NASA partly because they weigh 10 pounds, will be used to help the crew monitor the orbiter's position as it circles the globe. The laptop's 8-in. amber display mirrors the large-screen projection of the shuttle's course and position at NASA's Mission Control Center in Houston.

While the astronauts' ability to navigate by sight is little hindered by nightfall, as would be the case with aircraft flying closer to Earth, they are not always able to simply glance out of the cockpit to eyeball the Earth's surface to pick up landmarks.

The fluctuating course and altitude of the shuttle, combined with the Earth's curvature, frequently moves the planet out of the crew's field of vision so that only a black, star-filled sky appears in the cockpit window.

SPOC displays a map of the Earth, the elapsed mission time and the orbiter's latitude and longitude on an electroluminescent screen. Also displayed in the



Astronauts with a Grid laptop

time remaining before significant junctures in the shuttle's orbit, such as approaching the equator and sunlight/darkness boundary crossings and anticipated temporary lapses in ground-station radio contact.

The mission-status display program is based on a modified version of the high-order software language used by the shuttle's five on-board computers.

Taking pictures

The software program also enables the crew to compute the optimum aperture and lens settings for the crew's Nikon and Hasselblad cameras when photo-

graphing the Earth. A formula is used to determine the amount of sunlight reflected by the Earth's surface.

SPOC also makes use of another program that allows the crew to make calculations that would be used to orient and control the spacecraft in an emergency. This function, normally controlled by the shuttle's general-purpose computers, would have to be manually set by the crew if the orbiter's redundant on-board computers were inoperable. Extensive calculations would be needed to determine the correct setting.

The SPOC software was writ-

ten by the SPOC team, a group of contractors at NASA, with assistance from Grid's engineers. In addition to writing programs, the SPOC team tailors them for specific flights and provides supplemental training to the shuttle crew in using SPOC's various features, said Dan Adamo, SPOC team leader.

Grid portables were the first laptops to be carried into space and have flown on 20 missions since 1983. The two laptops that are to be used in the upcoming *Atlantis* flight are Grid's Compass models running Intel Corp.'s 8086 microprocessor, software programs running on internal 384K-byte bubble memory and four 64K-byte erasable programmable read-only memory chips.

The technology is close to being cutthroat, Adamo conceded. "The reason that we use them is that we go through a great deal of effort to certify the hardware configuration for the flight. While SPOC is not flight-critical, we have made modifications to it, and we know that it is reliable. The overhead to upgrade it is quite high, so it will be a few more flights before we upgrade," he said.

The SPOC team is currently evaluating Grid's Gridcase 1530 laptop, which uses Intel's

80386, for use on missions planned for next year. The team is also considering whether to use Microsoft Corp.'s MS-DOS or The Santa Cruz Operation, Inc.'s SCO XENIX System V.

"There are compelling reasons to upgrade; the flight crews keep requesting more functions," Adamo said. The response to SPOC from shuttle astronauts has generally been positive, he added.

Dataease

FROM PAGE 61

The product, scheduled to ship this month, also includes a Multiformat feature that makes forms building easier and allows for up to 32 repeating tables.

Dataease plans to support two primary database servers. Because of the so-called open architecture, the company plans to support the Ashton-Tate, Microsoft Corp. and Sybase, Inc. SQL Server, which is scheduled for shipment later this year or early next year.

According to Dataease, it will also support IBM's OS/2 Extended Edition Database Manager once it becomes a full-blown server sometime in the next year.





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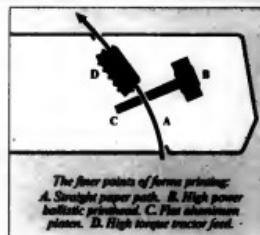
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CR-02/84WS

Magic

FROM PAGE 63

think without giving out secrets. If the Idea Generator sounds like an expert system, it's not. It will not render a solution to a problem but can only guide the user to a possible solution.

This is not the first time Daryl has sought brainstorming help: His bookshelf is full of books on creativity. His software shelf includes other packages such as Mindmirror by Timothy Leary, Inc. and Maxthink, Inc.'s Maxthink, which are both now collecting dust. "Other packages outlined my existing ideas. This one helps me come up with them," Daryl says.

Guarded work

Idea Generator helps the business side of Daryl's life in other ways. For example, Daryl poses the problem of how to maximize his performing time during the holidays. The Idea Generator has guided him to 65 different ways to increase his income, none of which he was willing to share. "There are magicians who read *Computerworld* too, you know," he says.

Although magicians seem to have an endless array of tricks, all are based on the same 19 ef-



Daryl fans the magic deck

fects. "Magicians have certain methods we use as tools, and with these tools we can construct any effect. This isn't the secret. The secret and hard part is coming up with a new effect," Daryl says. The 19 effects include: disappearing, transposition, translocation, transposition and levitation.

The Idea Generator Plus, the latest release, can export ideas directly to Agenda, Lotus Development Corp.'s idea management package. It runs on any IBM PC or compatible with 256K bytes of memory. The suggested retail price is \$195, which includes a book called *The Art of Creative Thinking*.

A/UX

FROM PAGE 61

number of Macs into GE for non-Unix purposes.

Even Apple downplays the role A/UX plays in its efforts to reach technical users within large corporations.

"A/UX is only one factor," said Michael Homer, manager of technical markets at Apple. "The most important factor is the availability of design, drafting and modeling applications for the Mac."

"A/UX is really the icing on the cake," Homer claimed. Unix capability has allowed Apple to bid for government contracts, an area which could become a lucrative business for Apple. "Unix — especially Posix compliance — is critical in the federal government," he explained.

A little help

Apple's efforts to reach technical users received a boost in June when Autodesk, Inc.'s AutoCAD computer-aided design package was ported to the Mac operating system.

However, no AutoCAD version was ported to A/UX. AutoCAD is the top-selling engineering package on personal computers, according to Dataquest, Inc., a San

Jose, Calif., market research firm.

Dave Burdick, vice-president of Dataquest's industrial automation group, said Apple has been making strides in technical environments as engineering packages are released for the Mac.

As with AutoCAD, however, those packages are being ported to the Mac operating system rather than A/UX, even though Unix is a well-established operating system for engineering applications.

Apple has also had little success convincing third-party developers of commercially popular Macintosh packages to rewrite their products for A/UX. Although Apple initially stated that most Mac software would run under A/UX, few applications were found to be fully compatible.

A real shinier

"A/UX is kind of a black eye within Apple," Burdick said. "It's rather cumbersome and incredibly slow." The A/UX package consists of 30 Mac disks. "Most software developers look at this thing and say 'Forget it,'" he maintained.

Users are waiting for a new version of A/UX offering a compatibility window to the Mac en-

vironment. Burdick said the new release has been delayed because of technical difficulties.

Apple's Homer declined to comment, saying the firm does not preannounce products.

Marketing hay

While Apple struggles with A/UX, the Mac operating system continues to gain ground with the engineers and technical users who are theoretical customers for A/UX.

"It offers windowing, a graphical user interface and new applications without the added cost of a traditional engineering workstation," Burdick said.

An as-yet unreleased version of the Mac operating system will reportedly offer multitasking capabilities, considered one of the compelling arguments for Unix. Burdick said the addition of multitasking capabilities should enhance the Mac's popularity with technical users.

"The success of future versions of the Mac operating system will depend on the future of A/UX within Apple," Burdick said. "Apple didn't think it could be a major workstation player without a Sun-like version of Unix, but now they're finding that a different kind of environment can be accepted in those markets."



Barney

CONTINUED FROM PAGE 61

cause its 32-bit nature didn't jibe with a slower bus. But the 80386SX chip, with its 16-bit data path, is another story and was what the *Journal*'s sources received to. Lowe explained that IBM said it would take a chip over a 32-bit I/O. This left the door wide open for a 386SX machine, which is a 16-bit I/O path.

According to our information, the product, code-named Snowmass, was originally scheduled to ship this January. However, its brother, the Personal System/2 Model 30/296, had been scheduled to ship last August and was code-named Vail. Since that product shipped

out in September, Snowmass may also get delayed. But as long as it makes it this winter, its name will still be fitting.

EISA come, EISA go? We're not too big on vaporware around here. After years of gloatingly unshipped products, we are fed up. That is why the Extended Industry Standard Architecture group had terrible timing. Right as vaporware was becoming something raked over the coals, these guys announced a Micro Channel Architecture (MCA) competitor set to ship next year.

According to the specifications, the EISA bus is technically no better — and perhaps worse — than the MCA bus. At least software vendors know enough to hype products that should be better than

those available today.

While many will admit that EISA is a laudable goal, there are some real problems. For one, it is not a complete spec. In addition, it does not cover the memory bus. With memory prices the way they are, these are the things users really want to move over. And with news beginning to emerge that many EISA players are still planning Micro Channel machines, it just may be EISA come, EISA go.

Chopped up SE. Look for a version of the Macintosh SE with a separate monitor that will help Apple beef up its mid-price Mac line. The beauty of the system is that users can choose from a range of larger, high-resolution monitors without going to the expensive Mac II.

Where's that portable? Several computer publications (not us) stuck their necks out and said that IBM would announce a new portable in October. Well, it's November, and so far, no portable. Like other vendors, IBM has to pass Federal Communications Commission radio emissions tests, so that PCs don't change the channels on our frequencies or scratch waves with fire, ambulance or aircraft radios. While this is essentially a downsized PS/2 Model 70 with the Micro Channel apparently flushed badly and won't even make Comdex/Fall '88. But don't touch that dial. Once the emissions are in check, it's a go.

Servin' it up. IBM is charging hard in the race to ship the first OS/2 SQL-oriented database server. The firm had said it would have a server version of OS/2 Extended Edition out next summer, but sources familiar with IBM's plans say it is looking more like spring. That puts IBM in the same ballpark as the Ashton-Tate/Microsoft/Sybase SQL Server, which many now expect to ship in early winter; Oracle's OS/2 server, set to ship sometime later this year or early next; and Lotus/DBMS, set to ship sometime this decade. And with IBM's open strategy that encourages third-party development, things are looking pretty aggressive in the '9 server market.

Worm history. Users struck recently by the dreaded Unix virus may think this is a new thing. But mainframes have known about viruses called worms for years. These nasty critters inserted their virus into computer systems and then, after the unsightly backup or disk access, go into action. The end result is a malfunction or just a booby message.

Worms have also been kicking around micros for years. Back in 1984, there were reports of Apple II worms, but the most insidious worm strategy was concocted by the copy-protection vendors.

In late 1984, two firms that duplicated disks for software makers had devised the same scheme to put booty traps on the disks of copy-protected software. Vault Corp. had planned the Killer Prolok, which would create nasty effects when the disk was illegally copied. Possibilities included the reformating of a hard disk, the restarting of the machine in the middle of a task and other horrible crimes against PC users. Users would have had no way of knowing the disk contained the worm. Defendisk, another copy protection firm, had an even more evil outlook.

"Our booby trap will make Vietnam look like a birthday party," a company spokesman was quoted as saying.

Thank goodness these plans were never adopted by the leading software firms. Consumers would not look kindly on this type of sabotage.

It's a whole new business. On Halloween, Microsoft and IBM held a press conference to announce that a product was shipping. Even funnier than that, a heck of a lot of people showed up. I guess it's better than those press conferences held recently that announce that products will be late.

According to my sources, Computerworld is now considering holding a press conference every Monday to announce that our issue is shipping. Wanna come?

Barney is a Computerworld senior editor, microcomputing.

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NEW PRODUCTS

Systems

A portable, handheld workstation that can be configured with up to 4M bytes of random-access memory has been introduced by Telxon Corp.

Weighing in at 28 ounces, the PTC-730 reportedly offers a 16-bit architecture and four-way communications options. Other features include a 4.77-MHz clock speed and windowing capabilities. The device is Microsoft Corp. MS-DOS 3.2 compatible, the vendor said, and is especially suited for field sales information and order/entry applications.

The PTC-730 is priced from \$800 to \$2,000, depending on configuration.

Telxon, 3330 W. Market St., Akron, Ohio 44313. 216-667-3700.

A combination hardware and software sales force automation system is now available from Lowell Corp.

Designed specifically for the professional field salesperson, Prosell is available in a choice of two 9-pound hardware platforms, running on either a Data General Corp. laptop or a laptop



Telxon's handheld workstation

machine offered by Grid Systems, Inc.

According to the vendor, features include calendars, expense reports, letter writing, prospect summaries, Help screens and graphic capabilities.

The complete Prosell system costs \$4,000 and higher, depending on hardware configuration.

Lowell, P.O. Box 158, Worcester, Mass. 01613. 508-756-5103.

The Themos 386 multiuser, multitasking operating system is now available from Themos Software Corp.

The software runs on any Intel Corp. 386-based machine, supports up to 128 users and is said to address up to 4G bytes of physical memory. A multimediascaping feature is included that allows the main personal computer console to toggle between as many as 12 screens simultaneously running individual applications.

A Themos C compiler is also available to allow both Unix and DOS C programs to be recomplied to run under Themos 386 with little or no change, the vendor said.

First-time buyers may purchase Themos 386 for \$700. Bundled Themos 386 development kits are priced from \$1,595.

Themos Software, Suite 360, 1777 Betebo Drive, Walnut Creek, Calif. 94596. 415-935-1118.

Software applications packages

Digital Research, Inc. has released Version 2.0 of its GEM Desktop Publisher.

According to the vendor, significant enhancements have been made to the product, including automatic hypertext linking, line-art generation within the program, more typeface support, extended paragraph control and additional file-type compatibility. A graphics toolbox has also been incorporated with Version 2.0 to give users the ability to create elements and lines in a document with a variety of fill styles and colors. The latest version runs on the IBM Personal Computer XT, AT, Personal System/2 and compatible systems and requires a minimum 640K bytes of random-access memory and a hard disk.

GEM Desktop Publisher 2.0 costs \$299.

Digital Research, Box DRI, Monterey, Calif. 93942. 408-649-3895.

Nichols Software has released an enhanced version of its Filer 1099 tax software for personal computers.

The new product, Filer W-2,

was designed to handle W-2 forms. Software to handle forms 5498, 1098 and W-2Ps is also now available.

Filer software is sold in a forms-only version and forms-plus-magnetic-media version. The products create a database of information that can be printed, reviewed, updated and printed.

The forms-only version of the program sells for \$25 per type and is \$50 with magnetic media added.

Nichols Software, P.O. Box 152, Jackson, Miss. 39205. 601-922-9037.

North Edge Software Corp. has released a networked memory-resident time and expense tracking and billing system that was designed for service professionals.

Timeslips III Version 3.3, Network Edition, the software runs on any DOS 3.1 or higher capable network. A 448K-byte hard drive is required for operation.

Timeslips III Version 3.3, Network Edition costs \$699.95. North Edge Software, 239 Western Ave., Essex, Mass. 01929. 617-468-7358.



An integrated software program that runs on IBM Personal Computers and compatible machines under Microsoft Corp.'s MS-DOS has been announced by T/Maker Research Co.

Called T/Maker 2.0, the package reportedly combines word processing, spreadsheet and database management software functions, as well as providing spelling-checking, open-access Help files and chart-making capabilities.

Two floppy disks or a hard disk and a minimum of 385K bytes of random-access memory are required to operate the T/Maker package, according to the company.

T/Maker costs \$295.

T/Maker Research, 812 Pollard Road, Los Gatos, Calif. 95030. 408-866-0127.

Space-Time Research, an Australian-based high-tech firm, has introduced Supermap U.S.A., a compact-disk/read-only memory and floppy disk software package that allows personal computer users to retrieve, analyze and map 1980 U.S. Census data to their own specifications.

The program reportedly runs on any IBM Personal Computer or compatible system and provides information down to the enumeration district and block-group level. According to the firm, current zip code boundaries are also provided, and census data tables can be exported to spreadsheets.

A minimum of 512K bytes of random-access memory is required along with an IBM Enhanced Graphics Adapter, the

company said.

Supermap U.S.A. is priced at a maximum of \$2,730 to include all regions of the U.S., according to the company.

Chadwick-Hesley, Inc., 1101 King St., Alexandria, Va. 22314. 703-683-4890.

Business & Professional Software, Inc., has announced a \$200 price reduction on its 35mm Express 4.1 software program. The package will now retail for \$495.

Version 4.1 of 35mm Express allows users to prepare and produce 35mm slides, overhead transparencies and paper handouts for meeting presentations in a microcomputer environment. It can also merge files into several desktop publish-

ing systems, including Aldus Corp.'s PageManager and Xerox Corp.'s Ventura package.

Business & Professional Software, 143 Biney St., Cambridge, Mass. 02142. 617-491-3377.

Evolution Computing has announced Fastcad 2.0, the latest release of the company's computer-aided design software for IBM and compatible personal computers.

New features reportedly include user-definable symbols, independent X/Y scaling capabilities and eight simultaneously active drawing windows. Device drivers for the IBM Colorjet printer and Xerox Corp. 100 and 200 series printers have also been added to the package.

Registered Fastcad users can upgrade to Version 2.0 for \$35, plus \$5 for shipping and handling.

Evolution Computing, Suite 106, 437 S. 48th St., Tempe, Ariz. 85281. 602-967-8633.

A multimedia information management, retrieval and publishing system for Microsoft Corp.'s MS-DOS computers has been announced by Crownshield Software, Inc.

Called Mediabase, the product allows nontechnical users to build and access databases in which unlimited text, graphics, audio and visual images can be combined, the vendor said.

All words in all files are indexed automatically, and the product eliminates fixed field sizes and types.

Mediabase costs \$750.

Crownshield Software, 98 Crownshield Road, Brookline, Mass. 02146. 617-232-4805.

IBM Corp. has announced the IBM Displaygraphics licensed program. The product is a full-function interactive package for IBM Personal Computers that are based on Intel Corp. 80286 and 80386 processors running under DOS.

The software consolidates facilities for the creation and modification of three major forms of graphics used by business: point-and-business charts and text (fonts). Output may be printed or plotted at the personal-computer, or sent to a host computer for use by host applications, the vendor said.

IBM Displaygraphics costs \$650.

IBM, 400 Parsons' Pond Drive, Franklin Lakes, N.J. 07417. 201-848-1900.

Rhinetek, Inc. has upgraded its EMU/470 color graphics terminal emulator. The product is said to emulate all of the Digital Equipment Corp. high-end terminals, including the D411, D461 and D470C.

The upgrade includes a simulation of compressed mode on a standard IBM Enhanced Graphics Adapter (EGA) or Video Graphics Array (VGA) display, Xmodem file transfer protocol and increased graphics speed, the vendor claimed.

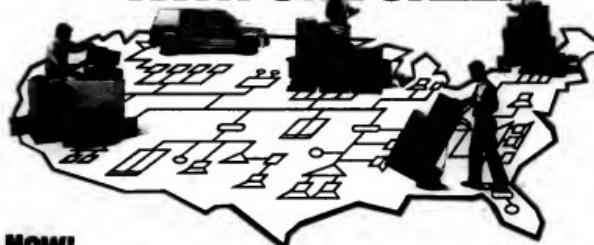
The program has 70 macro-definable keys along with automatic dithering and logical functions.

Both file-capture and protocol support are included. The emulator runs on all IBM Personal Computer, PC AT, Personal System/2 and compatible systems. Graphics and compressed modes require EGA or VGA support.

EMU/470 costs from \$175 to \$195.

Rhinetek, P.O. Box 220, Columbia, Md. 21045. 301-730-2575.

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Control Automation, Inc. has begun shipping Release 2.5 of its three-dimensional modeling software, called Modelmate.

Expanded design capabilities are said to include support for AT&T's Targa, Control Systems Inc.'s Artist 10 and Illustrator, IBM's Personal System/2, IBM Video Graphics Array and other high-resolution boards. According to the vendor, Modelmate costs \$349, and current users may receive an upgrade for \$200.

Control Automation, P.O. Box 160100, Altamonte Springs, Fla. 32716-0100. 407-682-7077.

Daybreak Technologies has released an enhanced version of Sills, the company's personal computer spreadsheet program.

Version 1.1 reportedly offers an improved recalculation time and support for almost all major printers currently on the market for both text and graphics printing applications.

The latest release also includes an extension of the product's interactive help session that allows users to get definitions and examples of macros while entering them. The software system requirements include an IBM or compatible PC with 512K bytes of random-ac-

cess memory. Dual disk drives and IBM PC-DOS or Microsoft Corp. MS-DOS 2.0 or higher are also required.

Silk 1.1 costs \$298. Daybreak Technologies, 3rd Floor, 21311 Hawthorne Blvd., Torrance, Calif. 90503. 800-443-0100.

Powermax Co. has introduced an on-disk library that reportedly contains 175 macros to be used with Wordperfect Corp.'s Wordperfect 5.0.

Called Powermax 5.0, the software was designed to automate several complex word processing functions into a one-key operation. Features include an automatic bookmark, automatic creation of endnote and footnote lists and several text-handling routines. The product runs on all IBM and compatible personal computers.

Powermax 5.0 costs \$19.95. Powermax, Suite 845, 15840 Ventura Blvd., Encino, Calif. 91336. 818-905-5919.

Revelation Technologies, Inc. has released Version 1.1 of Advanced Revelation, its relational database management system.

New features reportedly include a proficiency level Help system that will enable users to

customize the Help facilities to individual levels of expertise. Reporting and query options have also been added to assist users in creating a report or querying a database. Other enhancements include the foundation for SQL and improved index-search capabilities.

Advanced Revelation 1.1 costs \$950. The product is available to existing Revelation G users for \$400, and Advanced Revelation 1.0 users may obtain the upgrade for \$40.

Revelation Technologies, 2 Park Ave., New York, N.Y. 10016. 212-689-1000.

PC Publishing, Inc. has announced a companion product for Lotus Development Corp.'s 1-2-3 spreadsheet package.

Called Graph-Mania, the software can be displayed in a look-up window on the spreadsheet to provide a set of screen management options, the vendor said. The program allows users to choose the number of rows and columns of data entry they want displayed. The look-up window shows a graph that is modified in real time as the user works on the spreadsheet.

Graph-Mania costs \$99.95. PC Publishing, 1801 Avenue of the Stars, Los Angeles, Calif. 90067. 213-556-3630.

lowered from \$99.95 to \$69.95, according to the vendor.

Systems Management Associates, 3325 Executive Drive, Raleigh, N.C. 27609. 800-762-7874.

Macintosh products

Solutions International has introduced a software communications product for Apple Computer, Inc.'s Macintosh machine.

Called Backfax, the package reportedly sends or receives facsimile transmissions in the background while another application is running with the AppleTalk module.

It is priced at \$245.

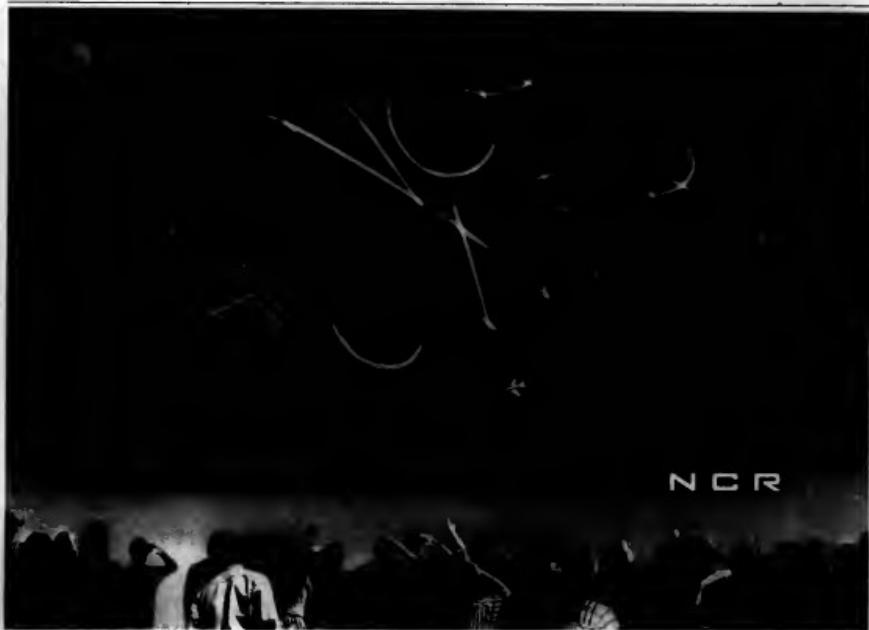
Solutions International, 30 Commerce St., Williston, Vt. 05446. 802-658-5506.

Knowledgebase Corp. has announced a search and retrieval program for Apple Computer, Inc. Hypercard users.

Hyperkra, when combined with Hypercard, increases database performance to make the Macintosh an effective platform for corporate computing environments, the firm said.

Hyperkra costs \$795.

Knowledgebase, Suite 500, 888 Villa St., Mountain View, Calif. 94031. 415-966-9888.



A series of user-customizable accounting software for Apple Computer, Inc. Macintosh computers has been announced by Satori Software.

Components is a modular software series that includes an object-oriented graphics program for creating forms and reports. Adobe Systems, Inc. Postscript text, shades of gray and variable line thicknesses are also

supported. The first available module is general ledger, scheduled to ship at year's end.

All Components modules will be priced at \$595.

Cognition Technology Corp. has introduced Hypersmarts, a hypermedia-based organization-

al tool for business.

Running on an Apple Computer, Inc. Macintosh computer with 512K bytes of memory, the product reportedly allows non-programmers to convert Apple Hypercard stacks into expert systems. Users may also put customized interfaces on rule-based advisors.

Hypersmarts costs \$99.95. Cognition Technology, 55

Wheeler St., Cambridge, Mass. 02138. 617-492-0246.

Training

Flytrack Learning Systems has introduced a self-study audiotape course for users of Aldus Corp.'s Pagemaker 3.0. In five cassette lessons lasting an hour or two each, How to Use Pagemaker (PC Ver-

sion) will reportedly teach users to produce a variety of publications, including a flyer, a newsletter and a brochure.

The course costs \$195.

Flytrack, Suite 200, 999 Main, Glen Ellyn, Ill. 60137. 312-790-1117.

Peripherals

A receive-only dot-matrix impact printer that prints up to 120 char/sec. has been introduced by Advanced Communications, Inc.

Designed for electronic mail applications, the MP 8010 is said to include both Xmodem and proprietary error correction protocols. The unit lists at \$795, and quantity discounts are available.

Advanced Communications, 1039 Kiel Court, Sunnyvale, Calif. 94089. 408-734-9636.

Arkwright, Inc. has introduced page-formatting software for use with Hewlett-Packard Co. LaserJet II printers or any Adobe Systems, Inc. Postscript-compatible output device.

Called Laserkey, the product boasts a 15-page learning curve and reportedly provides 19 page formats.

Options include automatic bulleting, underlining and numerical lineups. The software is available in both 5 1/4- and 3 1/2-in. disks and runs on any IBM Personal Computer or compatible, the vendor said.

Laserkey costs \$99.95. Arkwright, Main St., Fiskeville, R.I. 02823. 800-942-5900.

A 20-in. graphics display subsystem for use in desktop publishing and computer-aided design environments is now available from Vestek Corp.

Designed the AT 2000, the product is said to offer 1,280-by 1,024-pixel resolution and IBM Video Graphics Array compatibility, including grayscale modes. The subsystem includes a 20-in. monochrome monitor; an IBM Personal Computer AT base adapter card, required software utilities and drivers, interface cabling and a user's manual.

The AT 2000 costs \$2,895 and comes with a six-month warranty.

Vestek, Suite 102, 31336 Via Colinas, Westlake Village, Calif. 91362. 818-991-3666.

Datasieve International, Inc. has announced a product that links the company's relational database, Datasieve 2.5, with AT&T's Overview scanner to form a relational imaging data-base system.

Called Imag-In, the software is compatible with IBM Personal Computer ATs and compatible Intel Corp. 80286- and 80386-based systems. According to the

Continued on page 82

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The new Kodak Optistar Autotouch finisher for the Komstar imaging system is productive proof of Kodak's continued commitment to the COM industry.

The Kodak Optistar Autotouch finisher lets you duplicate and collate file for optimum results with minimal operator intervention. And this new finisher's touch screen makes it uniquely easy to operate. Superb Kodak service and support, combined with advanced technology, assure high reliability and increased productivity. Compatible with current and future technologies, this important new product once again demonstrates Kodak's continued commitment to the COM industry. For more information, talk to your Kodak

Business Imaging Systems representative about the Optistar Autotouch finisher, or call 1-800-445-6325, Ext. 303.



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To find out more about NEC's I-Series and our extensive line of data communications systems and products, write NEC America, Inc., Data and Video Communications Systems, 110 Rio Robles, San Jose, CA 95134. Or call us, at 1-800-222-4NEC, ext. 1277. Because when it comes to versatile data communications systems, we'll talk to you on your own terms.

NEC

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Logitech, Inc. is now offering its Plus Package mouse enhancement software on 5½-in. media with its Series/2 Mouse, designed for Compaq Computer Corp.'s Design 386 machines, IBM's Personal System/2 and compatible systems.

The Series/2 mice are slated to ship with both a 3½-in. and 5¼-in. version of the software. The Plus Package reportedly includes a mouse driver and pop-up menu-building program for keyboard-based applications. The mouse is compatible with the auxiliary input interface found on the above-mentioned systems.

The Series/2 Mouse with software costs \$99.

Logitech, 6505 Kaiser Drive, Fremont, Calif. 94555, 415-795-8500.

Star Micronics America, Inc. has entered the color printer market with the announcement of two seven-color dot matrix printers for use with IBM Personal Computers and compatible systems.

Designated the NX-1000 Rainbow and the NX-1000C Rainbow, both products reportedly provide multiple internal fonts, a 4K buffer and near-letter-quality text at 36 char./sec. High-speed draft output is produced at 144 char./sec. in 12 char./in., the vendor said. The NX-1000 comes standard with a parallel interface and is compatible with most microcomputers, while the NX-1000C incorporates the standard Commodore Business Machines, Inc. serial interface for Commodore 64 and 128 machines.

Both the NX-1000 and the NX-1000C are priced at \$379. Each printer is also available in a monochrome version at a cost of \$299.

Star Micronics, Suite 3510, 200 Park Ave., New York, N.Y. 10166. 212-986-6770.

Kyocera Union, Inc. has announced several compact laser printers that provide seven emission modes and offer compatibility with most personal computer software applications, the vendor said.

The company offers the 10 page/min. laser printers—the single-bin F-1000A, which comes with 512K bytes of random-access memory and the two-bin F-2010 with 1.5M bytes of RAM. The 18 page/min. two-bin F-3010 model offers 1.5M bytes of standard RAM, expandable to 3.5M bytes. The F-2010 and the F-3010 offer dual 250-page cassettes for high-volume applications.

All three printers can emulate the following: the Hewlett-Packard Co. LaserJet Plus, the Epson America, Inc. FX-80, IBM Graphics Printer, Diablo Systems, Inc. 630, the Qume Corp. Sprint II, the NEC Information Systems Spwriter and a generic line printer. The F-1000A costs \$2,895, the F-2010 costs \$4,695 and the F-3010 is available for \$8,395.

Kyocera Union, 3165 Adeline St., Berkeley, Calif. 94703. 415-848-6680.

Numerics Corp. has lowered prices on its Manager Mouse line for IBM Personal Computers and compatibles.

The list price on the Numerics Manager Mouse is \$109, reduced from \$139, and \$179 down from \$219 for the color-less version. The product line reportedly features a cordless mouse and a software driver that accommodates 25 commonly used business programs.

Numerics, 101 Commerce Drive, Montgomeryville, Pa. 18936. 800-247-4517.

airline ticketing, car rental and other applications that require single-function workstations.

The HP ROM disc accessory costs \$235. The HP ROM disc programming kit costs \$260.

HP, 3000 Hanover St., Palo Alto, Calif. 94304. 415-857-1501.

Hauppauge Computer Works, Inc. has released the 386 Motherboard/AT, which produces overall performance upgrades of 2½ times the IBM Personal Computer AT, the company claimed.

The board will upgrade 6-MHz and 8-MHz PC ATs to 16-MHz Intel Corp. 80386-microprocessor speeds.

The unit comes with 32-bit random-access memory expansion connectors and

can be expanded with 12M bytes of RAM, according to the vendor. An Intel 80387 math coprocessor chip is optional, the company said.

The 386 Motherboard/AT costs \$1,795.

The company has also announced that its family of 386 Motherboards for the IBM PC, XT, AT and compatible computers can now support IBM's OS/2 Standard Edition 1.0.

The OS/2-compatible Bios Upgrade requires an additional 1M byte of random-access memory and a 1.2M-byte floppy disk drive.

The upgrade costs \$35. **Hauppauge Computer Works**, 175 Commerce Drive, Hauppauge, N.Y. 11788. 516-434-1600.

Board-level devices

Hewlett-Packard Co. has announced a read-only-memory (ROM) card for its line of HP Vectra personal computers. Called the HP ROM disc accessory, the card will reportedly allow software developers to store their applications in ROM or erasable programmable ROM.

The product comes with Microsoft Corp.'s MS-DOS 3.2 and sockets for as much as 768K bytes of memory to store applications.

The disc accessory can be set up to load the application automatically in ROM whenever the PC is turned on. This allows the HP Vectra PC to be customized by the user for various applications, including



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North Edge Software Corp. has announced the product acquisition of the PC/Audit card, previously developed and marketed by Bay Computer Corp. in Andover, Mass.

PC/Audit is a standard half-size expansion card that automatically tracks and times computer activities. The card reportedly provides an accurate audit trail for the allocation of computer resources or job costing. Additional functions include the ability to determine resource allocation within large corporate environments, assess employee productivity and manage interdepartmental billing.

PC/Audit costs \$299.95.

North Edge Software, 239 Western Ave., Essex, Mass. 01929. 508-468-7358.

DTT Computer, Inc. has announced several new motherboards for IBM Personal Computers and compatible systems.

The **FIM-106** 10-MHz motherboard, designed for IBM PC XT-compatible systems, reportedly includes built-in multiple I/O as well as one parallel and two serial ports. Both monochrome and color graphics are supported.

The **PTM-1230C** 12-MHz baby motherboard features zero-to-one-wait state and includes an ASIC chip set to minimize the number of components, according to the vendor.

A 16-MHz motherboard, the **PTM-1600**, reportedly offers page-mode access, built-in parallel and serial ports and a socket for an optional Intel Corp. 80286 coprocessor.

The company has also introduced the **TECH-1000A**, a computer system reported to be IBM PC AT-compatible. The product has been Federal Communications Commission Class B-approved and offers selectable zero-wait state, an 80286 coprocessor socket and a 102-key keyboard.

Pricing ranges from approximately \$395 to \$1,695, and all products are covered by a one-year warranty.

DTK Computer, a division of Datatech Enterprises Co., 15711 E. Valley Blvd., City of Industry, Calif. 91744. 818-333-7533.

Gammalink has introduced a personal computer-to-faximile product especially tailored to computer-aided design (CAD) environments, the company said.

Consisting of software and an add-in fax modem board for the IBM Personal Computer, Personal System/2 and compatible systems, **Cad-Fax** will transmit any CAD file written as a plot file in Hewlett-Packard Co.'s Graphics Language or Autodesk, Inc.'s Autocad PRP format to any CCITT Group III fax machine. When sending oversize documents, the product automatically divides each drawing into appropriate 8½-in. strips and inserts alignment markers. Transmission rate on ordinary phone lines is 9.6K bit/sec.

Cad-Fax costs \$1,995.

Gammalink, 2452 Embarcadero Way, Palo Alto, Calif. 94303. 415-856-7421.

A series of data acquisition and control cards for the IBM Personal Computer, PC XT and AT or compatible computers have been introduced by **Rapid Systems, Inc.**

The cards are available in 16 or 32 channels, and various development and quick-connect daughterboards are available. Controlling software is included with most models. Offerings include an IEEE-

based 488 controller card with Basic, C and Pascal support and an eight-relay actuator with eight digital inputs.

The cards range in price from \$95 to \$1,495; quantity discounts are available.

Rapid Systems, 433 N. 34th St., Seattle, Wash. 98103. 206-547-8311.

Ariel Corp. has recently introduced a pair of IBM Personal Computer bus digital signal-processing (DSP) coprocessors, the **DSP-C25** and the **PC-56**.

Each board reportedly features zero-wait state random-access memory and an optional 14-bit analog I/O.

The **DSP-C25** comes with a Texas Instruments, Inc., DSP chip, the TMS320C25, and fits into a single personal computer slot. The **PC-56** incorpo-

rates the Motorola, Inc. DSP56001 chip and occupies a short slot.

According to the vendor, as much as 192K bytes of zero-wait state memory may be installed in the **DSP-C25** and the **PC-56**, respectively.

PC-based development tools are also available. The company is offering the **ASM-320** macro assembler for use with the **DSP-C25** board and the **Bug-56** monitor and debugger program for **PC-56** users.

The **DSP-C25** and the **PC-56** cost \$595 each, and the **ASM-320** Macro Assembler costs \$49.95. Pricing information was not provided for the **Bug-56** program.

Ariel, Suite 404, 110 Greene St., New York, N.Y. 10012. 212-925-4155.

Radstone Technology has announced an 8M-byte high-speed dynamic random access memory board that supplies a prefetch cache facility for Motorola, Inc. VME applications.

The **REP**'s prefetch cache function reportedly reduces the average access time required for performing block transfers or sequential single-cycle transfers to 160 nsec. The product is said to achieve a type-read access time of 100 nsec on a cache hit and provides data transfers with a full 32-bit interface to the Motorola, Inc. VMEbus. Byte, word, long word and unaligned data transfers are supported.

The **REP** costs \$4,990.

Radstone Technology, One Blue Hill Plaza, Pearl River, N.Y. 10965. 800-368-2738.

How to tap 32,000 of our best ideas.

In the files of Patent Offices around the world are over 32,000 active IBM patents. Although all of them can't be used by turning on one computer switch, most were developed to do one thing: put advanced technology at our customers' fingertips.

For example, IBM scientists and engineers pioneered every major innovation in disk storage and developed today's most advanced systems. These systems let users store the entire customer files of a medium-sized business in the space of a four-drawer file cabinet.

An IBM researcher invented dynamic random access memory (DRAM), the most widely used computer memory technology. DRAM

Herko Electronics, Inc. has introduced an IBM Personal Computer AT-compatible system board that is available in speeds of either 10 or 12 MHz. Called the HE1 286 AT, the product reportedly features 640K bytes of RAM and a zero-wait-state random access memory.

According to the vendor, the board was designed as an upgrade device for IBM PC XT and AT systems and is PC-DOS-, OS/2- and Microsoft Corp. Xenix-compatible.

The 10-MHz configuration, minus memory, costs \$400; the 12-MHz version without memory is priced at \$475, the company said.

Herko Electronics, 4655 Ridge Road W., Spencerport, N.Y. 14559. 716-352-1102.

Aydin Controls has introduced the Patriot VGA/1024 Graphics Board, a video adapter board for IBM Personal Computers, PC XTs, ATs and compatible systems, as well as the IBM Personal System/2 Model 36.

When used with the company's 20-in. Patriot monitor, the product reportedly provides the maximum 1,024- by 768-pixel IBM Video Graphics Array resolution. Features include 40-, 80- and 132-col. text modes and support for hardware pan and zoom-in graphics and text modes. Support is provided for IBM and Microsoft Corp.'s OS/2. The VGA/1024 Graphics Board costs \$695.

Aydin Controls, 414 Commerce Drive, Fort Washington, Pa. 19034. 800-366-8889.

Vision Technologies has released Vision 8, an IBM Personal Computer XT- and AT-compatible image digitizer designed for the desktop publishing, medical imaging and scientific markets.

According to the vendor, the product captures five images from video cameras, video tape recorders, videotape controllers in 256 gray scales.

The board displays 256 gray scales or 256 colors out of a palette of 16.7 million and offers a resolution of 512 by 484 pixels. Other features include hardware zoom and panning, according to the company.

Vision 8 costs \$895.

Vision Technologies, a division of Everex Systems, 48504 Kato Road, Fremont, Calif. 94538. 415-683-2900.

GTCO Corp. has introduced a combination hardware package that reportedly combines several different components to form a complete computer-based design system.

According to the vendor, the Cadpak system incorporates a digitizer for graphics input, a high-resolution graphics controller for color display, a serial port for interconnection and extended memory capabilities.

Cadpak is available in two configurations: Cadpak without memory, which sells for \$999, and Cadpak with memory, which lists at \$1,488.

GTCO, 7125 Riverwood Drive, Columbia, Md. 21046. 301-381-6688.

Seattle Telecom and Data, Inc. has announced a 10-MHz Intel Corp. 80286-based accelerator board configured specifically for the Zenith Data Systems 151, 158, and 159 personal computers, the company said. The STD-Z-15X board includes 640K bytes of 16-bit memory and an Intel 80287 math coprocessor is optional. The card costs \$995.

Seattle Telecom, Suite 205, 12277 N.E. 134th Court, Redmond, Wash. 98052. 206-820-1873.

An analog input and digital I/O board for IBM Personal Computer ATs and compatibles has been announced by Data Translation, Inc.

Designated the DT2824, the board reportedly offers 50-kHz throughput and 16 lines of digital I/O. The card also provides a random-access memory channel-gain list that permits scans of any sequence of channels at any available gain, the vendor said.

A subroutine library and application software support are also provided, the company said.

The DT2824 costs \$995.

Data Translation, 100 Locke Drive, Marlboro, Mass. 01752. 617-481-3700.

Data storage

Dataversions has released a 5½-in. tape-cartridge conversion system for IBM Personal Computers, PC XTs and ATs, Personal System/2 and compatibles.

Called QIC/2, the combination hardware/software system reportedly allows users of any microcomputer 5½-in. cartridge tape utilizing the QIC/24 recording format to exchange files, libraries and folders with a personal computer. The complete drive, cable, controller and QIC/2 tape utilities package is available for \$2,195. The QIC/2 tape utilities are available separately for \$895.

Dataversions, R.R. 1, Box 33, Richmond, Mo. 64085. 816-776-5635.

Procom Technology, Inc. has announced two add-on storage products for the laptop computer market.

The PLT40 40M-byte external tape backup system reportedly features a 250K bit/sec. data transfer rate and adheres to the QIC 40 industry standard. The unit is available for \$750.

According to the vendor, the 5½-in. PLF360 external drive allows laptop computers to accommodate both 5½-in. and 3½-in. disks. The device features 360K bytes of memory and an average access time of 90 msec.

The PLF360 costs \$395.

Procom Technology, 200 McCormick Ave., Costa Mesa, Calif. 92660. 714-549-9449.



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NETWORKING

DATA
STREAM

Ivan T. Frisch

Help for the net manager?



The good news is that network management and control is the land of opportunity — the bad news — to paraphrase comic-strip character Pogo — is that the opportunity may well be insurmountable.

The development of artificial intelligence tools in recent years has been seen by some observers as one of the ultimate solutions for network management problems. Systems developed with such tools can automatically respond to network problems or can at least make suggestions to an experienced network manager on what actions to take.

This column will discuss why AI can provide only a foundation for effective network management. The substance, in the form of information, expertise and discipline, must come from the user.

For the sake of brevity, I will restrict the discussion to performance and fault management, omitting accounting, security and configuration management, as well as avoiding the broader issues of network operations.

Networks have had to be managed since they were first built. But for a long time, they were not managed very well. The real problem is that many systems are poorly understood and, therefore,

Continued on page 93

DEC greets MCA with open nets

Attitude change leads clone makers into Micro Channel compatibility

BY WILLIAM BRANDELL
CW STAFF

Digital Equipment Corp.'s product information switchboards were not jammed with customer orders after it announced support for IBM's Micro Channel Architecture (MCA) on Decnet last month. But customers said such support shows DEC is learning from its past personal computer mistakes.

Last month, after it announced plans to resell Tandy Corp. PCs, DEC announced PC integration products that included VAX/VMS Services for MDS 2.1 software and Decnet/Personal Computing Systems Architecture Client Software.

The latter product, Client Software, is significant not only because it brings MCA integration ability to DEC customers but also because it represents a dramatic departure from DEC's previously grudging acceptance of PCs as important to its customers.

Leapfrog
DEC has managed to leapfrog in front of even the PC clone vendor by offering an Micro Channel-compatible integration strategy.

Computer Intelligence, a market research group based in La Jolla, Calif., estimated that there are 25,000 MCA-based IBM Personal System/2s in the

U.S., in addition to the one million PCs presently attached to DEC VAXs.

The research group also noted that 56% of the planned PC purchases for 1989 among the coveted Fortune 1,000 sites will be MCA-based PS/2s.

DEC is now marketing a product that — when used in conjunction with 3Com Corp.'s Etherlink/MC controller card — connects IBM PS/2 Models 50, 60 and 80 into the Decnet network. DEC uses a similar strategy to hook IBM Personal Computer-based compatibles to Decnet, as well.

Although the Client Software product has so far received a

Continued on page 100

LAN-WAN tie-ins will lean on OSI

BY PATRICIA KEEFE
CW STAFF

FAIRFAX, Va. — As users continue to stitch personal computers together via local-area networks — all the while hooking those LANs into wide-area networks — their biggest headaches will come to center around network management.

To be successful, any approach to network management must take the corporate architecture into account, according to Vincent Barrett, a principal at Eason & Whitney here.

"You can't manage a single LAN; it's all part of the overall corporate system," Barrett said.

Increasingly, users struggling to cope with this issue will lean toward solutions based on the International Standards Organization's Open Systems Interconnect (OSI) standard, he said. The latter half of 1988 and most of next year is expected to produce a bumper crop of OSI-based technology.

During a recent interview here at Network Strategies, Inc. (NSID) facilities, Barrett joined several other consultants in taking a look at a number of connectivity issues and trends likely to

Continued on page 100

Boeing scrapes ISDN surface

Decides to take control, leave Bell in the dust

BY ELISABETH HORWITT
CW STAFF

SEATTLE — Boeing Computer Services Co. has already spent \$120 million, or approximately \$10,000 per employee, to migrate its voice and data communications to Integrated Services Digital Network (ISDN). But the aerospace contractor has only begun to explore possible applications for its telecommunications system, according to Robert Furtaw, an engineering manager at Boeing's Network Services Group.

As has been typical for many early ISDN installations, Boeing's original justification for its ISDN implementation came from cost savings on voice communications. The company deployed four AT&T SESS switches, which came on-line about three months ago, have replaced Centrex services and AT&T's Dimension private branch exchange (PBX) switches at Boeing and now handle voice communications for the company's Puget Sound and Wichita sites. They also connect IBM Personal Computers, eliminating the need for modems at

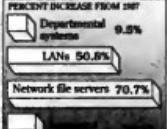
those sites.

Boeing still uses analog lines at other sites, Furtaw said. "Our migration plans hinged on the fact that our Hayes [Microcomputer Products, Inc.] modems can be deployed elsewhere."

Continued on page 90

Data View

Preferred technologies
A survey of banks tracking planned purchases indicates that use of key technologies above networks is a high priority in 1988*



SOURCE: MCILROY RESEARCH CORP., CW CHART

Inside

- ITT looks horns with IBM's DAE. Page 88.
- Designers find site testing ground at National LAN Laboratory. Page 91.
- NET expands SPX family of networks. Page 104.

Warning: Bargains can be hazardous to your network.

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Challenger tilts at IBM's DAE

BY ELISABETH HORWITT
CW STAFF

CHICAGO — A small software company has gone head-to-head with IBM's Distributed Automation Edition (DAE), announcing what it claims is an open software platform for developing applications to monitor and control manufacturing processes.

ITP Enterprise Software, Inc. in Boston introduced Mainstream at the recent Autofact '88 exposition held here. The product provides software tools and common interfaces that will cut the cost, risk and time it takes to develop multivendor

computer-integrated manufacturing (CIM) applications, according to ITP spokesman Robert Ryan. "The only real competitor we have is IBM's DAE," he said. DAE is said to provide similar software tools for developing cell control applications on an IBM Personal System/2 platform.

The product currently works with either Digital Equipment Corp. VAX/VMS or Unix systems and will eventually be ported to Microsoft Corp.'s version of OS/2, Ryan said.

Mainstream reportedly provides common interfaces to popular communications and database management systems.

The software platform is said to support DEC's Decnet as well as Transmission Control Protocol/Internet Protocol. It also provides access to DEC's RDB, Relational Technology, Inc.'s Ingres and Oracle Corp.'s Oracle. Applications written to Mainstream will work across all of these systems, making it easier to integrate factory automation modules into an overall CIM system, Ryan said.

Product targets

The product targets three markets, according to Ryan: large computer companies that "believe in CIM but hate the open architecture idea;" end users who are doing their own cell control, scheduling and warehousing applications and want to integrate "islands of automa-

tion;" and systems integrators.

Mainstream's common interfaces allow users to build CIM systems incrementally, starting small, Ryan said. It also can be merged with existing vendor platforms. For example, a company could use Mainstream to generate a cell control platform and integrate it with a VAX/VMS system that provides plant control.

The product addresses an increasingly mature CIM market. "We had to do a lot of custom work and found an obvious need to reduce the effort it takes to build such systems from the bottom up," said ITP spokesman Anthony Klemmer. Mainstream "provides developers with the least common denominator" in the way of CIM building blocks, he added.

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SSI connections link IBM to DEC

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Systems Strategies, Inc. (SSI), a Nynex Corp. company, recently introduced the CommLink family of software, which is said to link Intel Corp. Multibus, Motorola, Inc. VMEbus and IBM Personal Computer AT bus systems to IBM mainframes.

Also rolled out was Edlink, a family of communications software said to attach IBM's Application System/400 and System/38 to Digital Equipment Corp. Decnet networks without requiring any third-party protocols.

SSI also announced it has acquired Datamax, Inc., a privately held DEC-to-IBM connectivity software vendor and SSI competitor that developed Edlink. The purchase combines Datamax's VMS experience with SSI's IBM Systems Network Architecture (SNA) and Unix technology. Terms of the deal were not disclosed.

The CommLink family of software was designed to allow a variety of bus systems to be integrated into SNA and Binary Synchronous Communications (BSC) environments, as well as into CCITT X.25 packet-switched networks.

Features include support for IBM's 3270, RJE and LU6.2, and pricing averages about \$5,000 per unit user. Users reportedly can access IBM mainframes and send and receive IBM files while utilizing Advanced Program-to-Program Communications.

Edlink

Edlink applications reportedly feature menus that run over SNA, BSC and Decnet protocols. Third-party networking protocols are not necessary.

IBM and DEC MIS managers on longer have to support a foreign hardware bridge, communications software or Transmission Control Protocol/Internet Protocol, easing efforts to standardize and simplify network management.

Applications include bidirectional electronic mail and file transfer, terminal emulation and task-to-task communications between DEC VAX and IBM mid-range users.

The first product available under the Edlink family is Edlink/38. It performs file transfer and electronic mail, and pricing ranges from \$7,000 to \$20,000, depending on configuration.

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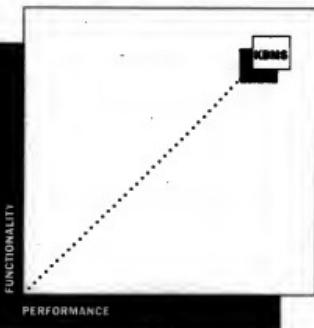
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MCI casts global fax net

BY PATRICIA KEEFE
CH STAFF

NEW YORK — MCI Communications Corp. recently laid claim to the title of being the first U.S. long-distance provider to offer a dedicated network for worldwide transmission of facsimile messages.

Industry analysts said MCI has essentially taken its long-distance fax service — available through MCI Mail — repositioned it as MCI Fax, a dedicated facsimile network. The service is slated to begin by the end of this month.

MCI is "just adding a wrinkle to what they already have," said Frank Drubek, president of Communications Network Architects, Inc., in Washington, D.C. "What they've done is opened up to tel-ex."

But MCI — as well as its competitors — need to do this in order to stimulate use of their mail networks, said Bart Stuck, a vice-president at Probe Research in Cedar Knolls, N.J.

The long-distance carriers, along with major systems vendors such as Digital Equipment Corp. and Unisys Corp., are all trying to roll out general platforms that will support a range of messaging services, according to Stuck.

At the same time, TeleScope Networks, Inc. announced that its TeleScope Fax Alert service will be the first to be delivered via the MCI Fax network. MCI Chairman William McGowan is a founding member of TeleScope's advisory board.

A spin-off of the vendor's TeleScope on-line information service, Fax Alert will provide daily three-page executive summaries of the top telecommunications news developments of the day, plus daily stock quotes for 30 telecommunications companies and a calendar of ongoing industry conferences and special events.

Facts on fax

MCI's enthusiasm for facsimile services is backed by healthy growth estimates. Today's \$3 billion fax transmission market is expected to grow to more than \$9 billion by 1991.

A big booster of facsimile services, McGowan added that the number of installed fax machines in the U.S. is expected to almost double this year and nearly quadruple in the next three years.

MCI Fax subscribers can transmit facsimile messages at up to 9.6K bit/sec. (Group III) and have over digital fiber-optic network facilities. The service reportedly will offer a number of unique features such as management information reports, customized dialing plans, toll-free 800 service, broadcast dispatch, delivery confirmation and distribution and security control features.

The system is said to accommodate any make or model of facsimile equipment. Via use of sophisticated software and existing MCI digital transmission technology, customers can use a wide array of nonfacsimile devices — including telex, electronic mail and personal computers — to generate fax messages.

The MCI system does not send images, provide store-and-forward capabilities or receive messages on a PC — capabilities that will prove key in the next two to three years, Drubek said.

Boeing

CONTINUED FROM PAGE 87

Pricing will be set using a fractional billing methodology — with an initial billing increment of 30 seconds and six-second increments thereafter — instead of the more conventional one-minute billing increment.

"We have tailored our fax billing structure to maximize the benefit to the user," McGowan said in a prepared statement. The fractional billing approach enables customers to pay only for the typical short-term facsimile transaction.

The service will be sold through MCI's sales force, as well as through equipment manufacturers, distributors and retailers.

Boeing hopes to realize big savings by doing away with separate voice and data lines at users' desks. One Basic Rate Interface line can support both types of connection. ISDN also will eliminate the \$500 cost of moving employees from one location to another, Furtaw said. Given that Boeing has some 120,000 employees, who move on an average of 1.2 times per year, this is a potentially large savings.

Under the older system, users whose PCs are linked to a local-area network have to make two kinds of address changes whenever they move. First, the Centrex or PBX must be reconfigured to

recognize the new address of the user's telephone; second, the LAN must be updated to recognize the workstation's new address. In contrast, with ISDN, "one change fits all," Furtaw said. Relocation entails unplugging a voice and data workstation from one wiring jack and plugging it elsewhere. Furtaw's group hopes to develop new software that will allow employees to punch in the new address for both voice and data systems on the telephone.

One big question is when, how, or even whether Boeing will use ISDN to replace dedicated connections that currently support communications between hosts and graphics terminals. The company currently uses 536M bit/sec. channels on a fiber-optic cable pipeline to support its

LANs growing out of control?



IBM Systems Network Architecture network, as well as channel-attached graphics workstations.

Boeing also has installed some 120 Vitanik Communications Corp. bridges, as well as Prism, Inc. routers to connect a variety of LAN installations over dedicated links. "All that is separate from ISDN, and we don't have to do a wholesale swap," Furtaw said.

One possibility is to install an ISDN-based X.25 network, which would relieve IBM communications processors of the need to act as network switches, Furtaw said. Routing between network nodes would be performed by packet switches, leaving the front-end processors with the job of providing access to local hosts. Because Boeing has some 50 IBM 3090

mainframes and communications processors are expensive, this may mean big cost savings, Furtaw said.

Time to work

Installing packet switches may also boost overall response time, because the front ends tend to get overloaded by heavy network traffic, he added. Boeing is currently talking to value-added network services about the possibility of taking care of remote user access to Boeing's ISDN X.25 network.

Boeing would also like to be able to link its private ISDN network with AT&T's Primary Rate Interface services. However, that means implementing a protocol called Signaling System 7 on Boeing's in-house SESS switches, an expensive mi-

never that only AT&T may be qualified to do, Furtaw said.

Furtaw said he has had trouble explaining the intangible benefits of ISDN to users, given that up-front costs are higher than the previous installation. He emphasized cost savings and benefits on the voice side, such as clearer lines and faster setup.

Right now, ISDN applications are limited to asynchronous dial-up transmission, with Basic Rate Interface cards replacing modems. "Users were happy with that [savings] but were still skeptical about ISDN until they actually had a chance to try out the network," Furtaw said. "Now they are coming up with problems for ISDN to solve; it's the old story of 'the application finds the network.'"

Put nets to the test at LAN lab

BY PATRICIA KEEFE
CW STAFF

WASHINGTON, D.C. — Designers sometimes have to risk a little "crash and burn" in order to fine-tune or build the right system. No pain, no gain, right? But tell that to an office full of inconvenienced users — especially if the system crash is deliberate.

Designers puzzling over the right configuration or products to meet their needs and requirements may shortly find a safe testing ground at the fledgling National LAN Laboratory.

Slated to go on-line here in January, organizers of the test facility recently outlined details concerning the launch and structure of the nonprofit lab.

Available to users, resellers and vendors, the lab will be self-funded, based mostly on user fees and special service charges, according to Del Jones, managing director of the National LAN Laboratory.

A neutral entity, the lab's goal is not to influence decisions but rather to provide resources to "try before you buy."

Toward that end, equipment and other resources will be made available to large businesses, government agencies, professional organizations, academics and the press for the purpose of creating, benchmarking and, if required, thoroughly testing complex, integrated networks.

Also key, the lab provides users with an environment in which system crashes that are a result of testing or bugs will not inconvenience hundreds of users or disrupt business operations.

To assist in these activities, the lab will house a donated sampling of more of the products used in departmental computing and a vast library of technical computer information. Equipment is expected to begin arriving in January.

Jones outlined a number of research scenarios that would be possible through the LAN Lab:

- Associations will use the equipment and software to create model systems for their profession or trade.
- Government and large users can assemble models of systems under consideration for acquisition in order to authenticate the functionality and reliability of those systems.
- Academics can explore and document the functionality of distributed systems. They can also alter their curricula to train the professionals needed to develop and administer distributed systems.

Also, laboratory staff and facilities will be used to coordinate industrywide cooperative activities such as guidelines, standards proposals, compatibility testing and generic research.

The lab will be staffed primarily by technical reporters from various computer publications, faculty on sabbatical and interns from large end-user organizations. Universities in the Washington, D.C., area are being solicited to provide facility space.



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Autumn brings frost and E-mail

BY PATRICIA KEEFE
CW STAFF

November does not just bring pumpkins and frost. This year, users will reap a substantial harvest of upgrades and enhancements to a medley of electronic messaging services.

Chief among these are additions to Digital Equipment Corp.'s enterprise-wide messaging services.

- Compound Document Architecture (CDA), said to be the first publicly available integrated architecture for creating, revising, managing and distributing compound documents with "live links" to text, graphics, image and applications data across multiple platforms via Decnet/OSI.
- Devoice Response System, a voice application platform that reportedly integrates digitized voice, text-to-speech synthesis and voice recognition accessible by phone.

• Mailbox Distributed Directory Service, which enables All-in-1 users to send mail to co-workers without having to know their location by allowing different directorys on the network to communicate.

DEC said CDA provides an opportunity for developers to link their applications into networked documents. CDA has been endorsed by such vendors as Aldus Corp., Apple Computer, Inc., Interleaf, Inc., Odetta Corp. and Eastman Kodak Co.

AT&T served up two standards-based offerings to its users: AT&T Electronic Data Interchange (EDI) and AT&T Mail Private Message Exchange (PMX)/X.400.

According to the vendor, its latest data network offering, AT&T EDI, features a unique twist — all components are priced separately. This allows customers to build their EDI networks one component at a time, paying only for the specific services, equipment or software needed to address their problems.

Available in June 1989, the ANSI X.12-compatible EDI service uses the same store-and-forward messaging network as AT&T Mail. It features four components: network usage, software, hardware and EDI support services, which include hot-line support and consultative support for EDI planners.

Another program plank is the EDI Network Interface Vendor Approval Program. AT&T said it will supply standards-based network interface modules to EDI software vendors. Customers will receive a list of software certified to support the AT&T EDI interface. Transcendents of Atlanta, a mainframe-based software developer, is the first approved vendor to land on the list.

AT&T Mail PMX/X.400 runs

on AT&T's 3B2 family of mini-computers and is said to allow messages from AT&T's private E-mail networks to be sent directly to any public or private E-mail network that complies with the international X.400 messaging standard. When used with AT&T's Mail Exchange soft-

ware, the vendor's X.400 service reportedly can convert other vendors' E-mail formats to the X.400 standard.

Slated for mid-November availability, the package costs \$4,995 running on a 3B2/310, 400 or 500 and \$6,995 when running on a 3B2/600 or 700.

Meanwhile, IBM recently introduced a common line for all of its commercial value-added network services and created a centralized, single-signature agreement to simplify contracting for its international customers.

Now known as the IBM Information Network, that network's reach has been extended to Hong Kong and Ireland, pushing

to 70 the total number of accessible countries.

Also jumping into international waters is Western Union Corp., which introduced Easylink International, a service said to provide a direct connection between domestic and foreign Easylink mail users. The service will kick off in the UK via Commercial Cable Co., a London-based subsidiary.

Everybody talks OLTP.

Tandem does it.

Frisch

FROM PAGE 87

currently uncontrollable.

One reason for this is user overconfidence. Some people think network management is trivial. Like the fellow who was amazed to find that he had been speaking prose all his life, network operators are pleased to

find that they have been doing network management all their lives. As a result, they do not always keep track of how the network evolves, and when problems do arise, they have trouble locating the source.

My organization, the Center for Advanced Technology in Telecommunications at Polytechnic University, has worked with a number of private-sector

companies to locate trouble spots on their networking systems. At one company, we found that one group knew the file transfer protocol and another knew the routing software, but no one knew both. Even worse was that although protocol layers were isolated in the specifications, by the time it came to implementation, coding shortcuts eliminated the separation.

Hence, management of protocol layers that looked good on paper required the revision of poorly documented software.

Clearly, in these cases network management is ineffective. Yet there are major corporations assuming that they have been doing the job. Will new AI systems and standards solve their problems?

The power behind an expert

system is an inference engine that draws conclusions about how to respond to a given situation based on a set of rules and a knowledge base of facts that have been fed into it. There are branches of AI that deal with systems that learn and gain more insight than humans have. However, as currently applied to network management, we are usually dealing with expert systems that try to incorporate the knowledge of a human expert and then emulate its performance. Of course, the gain is in labor and time saved. But in many cases, there are no experts who know the rules.

It is not just that systems are complex and no one has taken the time to master them or that the rules are being formulated. In some cases, the problems are simply unsolved.

Sitting around waiting

Let me give you some examples from the realm of multidomain or multivendor networks. In the area of fault management, we have found that in such widely distributed, highly asynchronous networks, queues of eight or 10 control messages can be sitting in a buffer waiting to be acted on. Such a queue can be an indication of impending buffer overflow, but we do not yet know how to characterize such an indication so that a rule-based system can recognize the problem and act on it.

In multidomain networks, a commonly discussed arrangement is to have individual network controllers monitored by an overall integrated network control center. The center receives only partial information and has only partial control; yet, in the area of configuration management, it has the responsibility of basic routing decisions such as which gateways to use on end-to-end routes.

The center's research in management of network protocols has identified problems that are open to automatic correction by network management systems. Instead of simply counting system timeouts and outages caused by software and protocols, it should be possible for a network management system to act automatically to correct these problems once they are identified. However, the problem once again is the absence of rules for determining what to do in any given case.

The networking industry is coming up with some effective products for managing networks, but until these systems have means to complete, accurate and effective information and rules for taking action, the management systems will only be shells without substance.

Frisch is director of the Center for Advanced Technology in Telecommunications at Polytechnic University in Brooklyn, N.Y.

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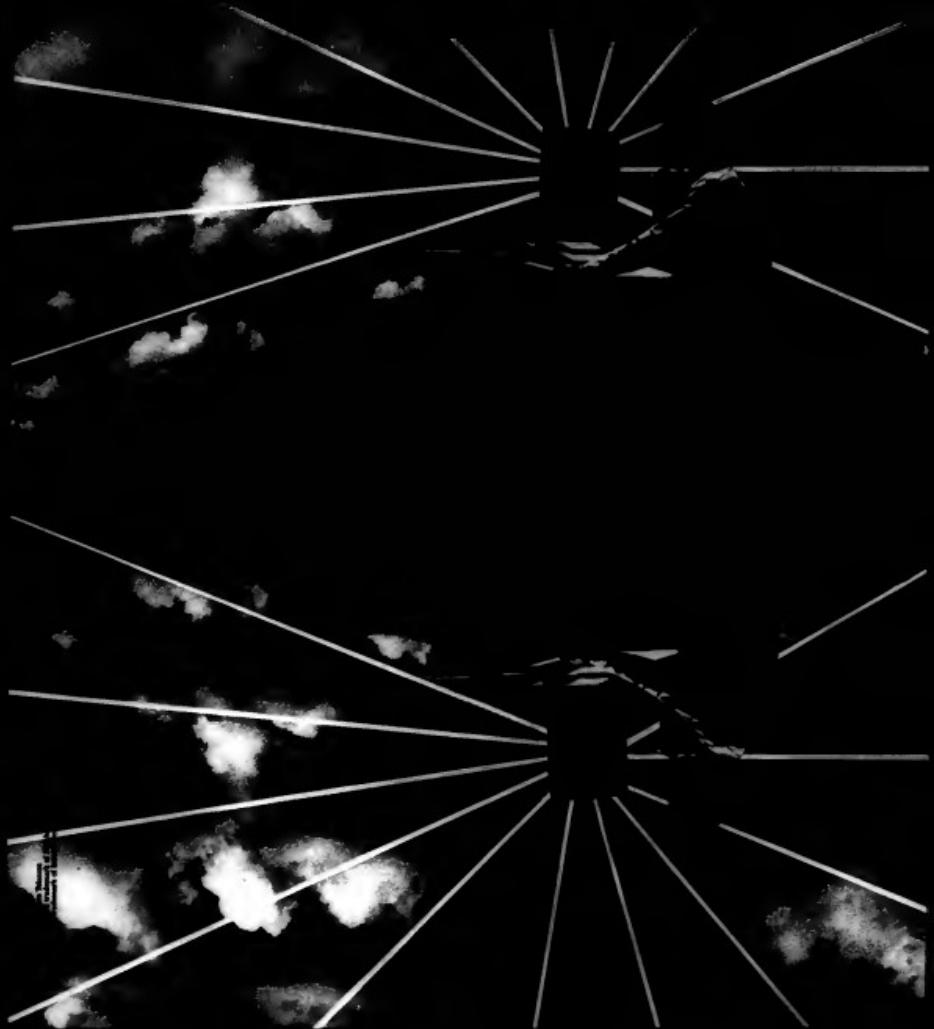
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Fibronics unleashes FDDI-based net products

BY PATRICIA KEEFE
CW STAFF

HYANNIS, Mass. — The first supplier to incorporate the SuperNet Fiber Distributed Data Interface (FDDI) chip set from Advanced Micro Devices, Inc. (AMD), Fibronics International, Inc. recently unveiled the FX8210 Ethernet-to-FDDI learning bridge.

Fibronics also introduced the FX8400 FDDI Extender and the FX8510 network management system for System Finex FDDI networks. System Finex is Fibronics' family of enterprise-wide FDDI communications products.

The FX8400 is said to extend the maximum distance between two adjacent stations up to 25 miles using single-mode fiber-optic media. In short, it allows for the integration of single- and dual-mode fiber.

FDDI is the ANSI standard for a 100M bit/sec. dual fiber-optic token-ring network. Only the definition for a network management station remains incomplete, and it should be settled by the spring.

Despite early problems with the AMD chip sets, Fibronics has not experienced a single glitch, said Hal Spuray, Fibronics' director of marketing.

The market for FDDI products is just now taking off, Fibronics President John

Hale said. FDDI is showing up in government and large customer's requests for proposals, he added. These three products serve to further Fibronics' aggressive thrust into FDDI. Unlike many larger providers of proprietary products, the Fibronics FDDI push is unfettered by migration issues. "We don't have any excess baggage," Hale said.

Fibronics' FX8210 bridge reportedly enables users to overcome the performance, distance and topology limitations of IEEE 802.3 Ethernet technology by connecting to an FDDI backbone.

The FX8210 bridge supports System Finex network management systems,

which enable monitoring and controlling of an FDDI backbone.

The FX8510 network management system consists of menu-driven software that runs on an IBM Personal Computer hardware platform and interfaces to any System Finex station. It costs \$495 per station.

Hale said adjusting the network management system to the network station management standard, once certified, will require minor software changes.

Available now, the FX8210 is priced at \$24,900. An optional bypass switch costs \$27,800.

The FX8400 reportedly transfers information at the full FDDI data rate of 100M bit/sec., thus preserving FDDI network performance across long distances.

Action E-mail boosts ease of use

BY PATRICIA KEEFE
CW STAFF

EMERYVILLE, Calif. — Responding to both increasing competition and sharp criticism from its installed base, Action Technologies, Inc. has rolled out a revamped version of its communications and management software for local-area networks.

User complaints that The Coordinator was hard to use and difficult to learn prompted a complete redesign of the user interface, which is based on IBM's Systems Application Architecture/Common User Access specification. The new interface reportedly cuts training time to 50% less than the previous version.

"All the enhancements we've made are the result of a great deal of feedback from our customers," said Thomas White, Action's senior vice-president of strategic planning.

White was formerly president of Infometrics, Inc., an industry research firm, and recently joined Action to jump-start its strategic planning efforts.

Other package highlights include a standard language, an automatic carry-forward feature that reminds users of late projects and deadlines and a streamlined menu and flexible windowing system.

The new windowing system reportedly lets the user work with calendars, set reminders, compose messages, read mail and write letters simultaneously. It also provides the ability to view multiple windows concurrently, categorize and view communications in various ways (including by subject or person) and respond to messaging without having to adhere to certain types of responses.

Scheduling is enhanced with management features that let users view schedules from one day to a full month.

Version II includes Message Handling Service, a store-and-forward mechanism developed by Action. It is said to be the first such service available for wide-area networks.

The program runs on all standard Microsoft Corp. MS-DOS-based LAN operating systems. Version II costs \$495 for stand-alone workstations, \$995 for a file server, \$995 for a 10-user expansion module and \$4,995 for a file server supporting up to 100 nodes. Version II upgrades cost \$295 for a LAN and \$99 for a stand-alone personal computer.

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Study: LAN surge ahead

At 76.8% growth, utilities contribute to market expansion

BY PATRICIA KREEPE
CW STAFF

TEMPE, Ariz. — The local-area network market can expect a significant surge in activity in the next 18 to 24 months from the utility industry, according to a recent review of 199 companies' requirements and buying plans.

Moreover, the growing interest in LANs is expected to tap mid-range systems' weakening demand for that technology, said the study by The Sierra Group, Inc., a market research firm based here.

On the opposite end of the networking spectrum, a separate survey of more than 200 power utility companies found that they are spending, on average, just more than one-half of their combined voice and data communications services budgets with the telephone companies.

Newton-Evans Research Co. in Ellicott City, Md., attributed this affinity for

A greater number of users — a total of 43.8% — in this primarily IBM group plan to increase spending on IBM networks, but another 6.3% also indicated they will cut back on purchases related to IBM LANs.

"Novell has outnetworked IBM," Kirk said, adding that DEC has come on very strong in the mid-range. "It's just more testimony that those IBM-owned accounts, as they look at IBM's capacity for networking, are not happy, or they would not be buying Novell LANs."

However, in the long run, the study noted, "The vendor that can provide single-source enterprise networking solutions will play an increasingly important role in this growth process and will have a greater impact on the long-range planning strategies of utility companies."

Survey respondents listed multivendor compatibility after laser printers as their primary concern. Kirk conceded that it remains to be seen what Novell has planned for the future. Despite Novell's dominance, she said, IBM and DEC are in the best position to respond to users' needs for enterprise-wide networking.

However, another industry giant, AT&T, is not faring as well on its end of the wire. While the local telephone companies gobbled up 51.4% of the respon-

dents' voice/data service budgets, AT&T had to make do with only a 23% market share.

Private, in-house voice/data networks grabbed another 16.8%, while common carriers (6.6%) and public data networks (2.2%) grappled for the remainder.

By 1990, the telephone companies can expect to make further gains in this area at the expense of AT&T. Newton-Evans said. Private network market share will increase only slightly.

Respondents broke down allocations of their overall data communications budgets into one of three categories: general business applications at 56%, utility-specific administrative applications at 11% and utility-specific technical applications at 33%.

Unlocking mainframe resources: spreadsheets.

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NOVELL has outnetworked IBM. It's more testimony that those IBM-owned accounts are not happy."

NANCY KIRK
THE SIERRA GROUP

the telephone companies to their local and regional nature.

Newton-Evans' report also revealed that technical applications receive a significant share of utility data communications budgets. It further found that growth in utility networks is being driven by an increasing number of purchases of personal computers and terminals. The Sierra Group shares a similar viewpoint.

Although utility installations offer less than lucrative opportunities in the short haul, inroads made today in the area of connectivity are likely to yield longer term dividends for suppliers, the Sierra Group said.

Among this group, LANs installed this year numbered 220, with plans to implement another 169 next year. "That's a 76.8% growth rate over the previous year, or nearly double the installed base," said Nancy Kirk, Sierra Group's director of industry research.

Echoing Newton-Evans' findings, Kirk pointed out that "the bottom line here is that just like in other industries, there has been tremendous growth at the desk top. There's just to link these thousands of PCs together."

Today's dominant networking suppliers, according to Sierra Group's utilities users survey, included Novell, Inc. and IBM, each with a 7.4% share of market; Digital Equipment Corp. with 3.7%; and another 9.7% spread out among several vendors. A full 71.8% of the market seems ready to be exploited.

This year's user purchasing plans find DEC and Novell running neck and neck — at 37.5% — among those planning to increase their expenditures on that product line.

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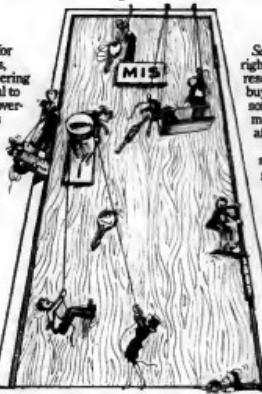
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LAN-WAN

COTINUED FROM PAGE 87

provoke users in 1989.

NSI was recently purchased by Ernst & Whitney, which will merge the consultancy into its Information Systems Group. Ernst & Whitney's consulting arm addresses functions such as long-range information systems planning, applications development, information systems management, review and information security services.

As part of this group, NSI will continue its focus on voice, data, video and integrated communications.

In addition to the acquisition, Ernst & Whitney has beefed up its telecommuni-

cations expertise with Barrett's appointment as principal earlier this year. He was formerly vice-president and services director for the Gartner Group, Inc., market researchers in Stamford, Conn.

Barrett will work with NSI consultants on helping users develop and update their connectivity strategies.

Another area in which Barrett and his co-workers, NSI consultant Marvin Charfot, say they expect to see strong user activity is backbones, with users centering the diverse spoken of their ever-expanding networks on high-speed standards-based backbones such as Fiber Distributed Data Interface (FDDI). Early products are just beginning to trickle into the channel.

FDDI will also spur user interest in

high-resolution graphics while satiating growing appetites for greater bandwidth. Barrett said: "There is just no substitute for [a lot of] bandwidth — I don't care how good data compression technology is."

Also feeding this demand will be 16Mbit token-rings slated for standard equipment this month from vendors such as IBM and Proteon, Inc. "There's a definite desire to have a 16-bit token-ring integrated with new micro-to-mainframe gateways," Barrett said.

Efforts to tie multivendor equipment into one backbone will also touch off great demand for bridge and router products, Barrett said. This market has already begun to heat up.

Host access is possibly what is most immediately impacted by users' efforts to

weave their computer equipment into one coherent system.

As PCs are moved to LANs, host access will become simplified. Instead of slapping terminal emulation cards into individual PCs, the desktop will gain easier access to the host via emulation software located on file servers, Charfot forecast.

DEC greets MCA

COTINUED FROM PAGE 87

lukewarm reception from VAX sites, it does provide PC managers with an upgrade path to include MCA products with the VAX environment, which is a crucial option for DEC to offer as it seeks Fortune 1,000 accounts.

"I have no intention of using this product now, but I expect it to play very importantly in my plans for a multivendor network," said George Billings, manager of network and computer operations at Pitney Bowes Corp. in Stamford, Conn.

He said he is now using the 3Com card to integrate PCs into Decnet and cited a "definite need" for the Decnet/PCSA product.

One of DEC's largest banking customers said that it was greatly interested in MCA integration products from DEC. The spokesman, who asked to remain

IHAVE NO intention of using this product now, but I expect it to play very importantly in my plans for a multivendor network."

GEORGE BILLINGS
PITNEY BOWES

anonymous, said that this strategy allows the company to remain a loyal VAX customer while simultaneously embracing the MCA as a standard.

Beyond the Fortune 1,000 firms, many smaller VAX sites have not yet shown any signs that they will warm to the new PC on the block. But the smaller shops are currently ignoring MCA-based PCs for the most part.

"About 90% of what we do on our VAX is done through terminals, terminal servers and the like," said Steven Cardillo, a data processing manager at the University of Kentucky in Lexington.

For years, analysts said, DEC's philosophical charter has ignored the existence of PCs at its customers' sites; it has tried to convince itself and its customers that neither needed PC products. DEC had its one operating system/no network philosophy. All that its customers needed, according to DEC, was a VAX, some terminal servers and DEC's VT terminals, and they had a computing environment.

But industry analysts acknowledge that DEC now appears to be rising above its own dogma. When it announced the Tandy agreement, DEC adamantly stressed that it would never embrace the MCA. But last week, DEC reversed itself, saying it would introduce a PS/2 clone if IBM dropped its MCA utility patent fees. Judging by user comments, statements like that will play well in its quest for Fortune 1,000 accounts.



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NEW PRODUCTS

Local-area networking hardware

Simple-Net Systems has unveiled Etherian Plus/MCA, an Ethernet local-area network designed specifically for the IBM Personal System/2 Micro Channel bus.

According to the vendor, the product is a turnkey 10M bit/sec. networking solution. The package includes a full-size add-in card, 25 feet of thin-wire cabling, a proprietary Netbios interface and the Simpleware network operating system. A tutorial user's guide and installation man-

ual are also included, and the product is offered with a two-year warranty.

Etherian Plus/MCA is priced at \$899.95 per node. Simple-Net Systems, Suite A, 545 W. Lambert Road, Brea, Calif. 92621. 714-526-5181.

Network Equipment Technologies, Inc. has expanded its SPX family of network processors developed specifically for use in Novell, Inc.'s Advanced Networks and 3Com Corp.'s 3+ environments.

According to the vendor, the product was designed for lower capacity point-to-point multiplexing requirements and small peripheral site requirements within

larger mesh or star networks.

The SPX/5 four-channel configuration costs \$1,295. The eight-channel unit costs \$1,595.

Network Equipment Technologies, 400 Penobscot Drive, Redwood City, Calif. 94063. 415-386-4400.

Local-area networking software

Lattice Corp., Inc. has released a version of its Context information retrieval and management product developed specifically for use in Novell, Inc.'s Advanced Networks and 3Com Corp.'s 3+ environments.

The textual database application product reportedly allows any IBM Personal

Computer a network to share public read-only documents and runs on Intel Corp. 80286- and 80386-based network servers. Prices range from \$1,495 to \$2,995, depending on system configuration.

Lattice Corp., 185 Berry St., San Francisco, Calif. 94107. 415-543-1199.

Brightwork Development, Inc. has introduced a new version of its PS-series local-area network software package.

PS-Print for Networks, ELS, designed for use in Novell, Inc.'s ELS Network Level II networks, is said to allow any personal computer on a Novell LAN to share locally attached printers while giving network users access to external printer.

Available for immediate delivery, the product is priced at \$295.

Brightwork Development, P.O. Box 8728, Red Bank, N.J. 07701. 800-552-9876.

Network management

Codex Corp. has expanded its integrated network-management systems capabilities with the introduction of three new products.

The **Codex 6742** and **6745** are reportedly the first in a family of flexible network interchange products said to combine STDM and CCITT X.25 technologies. The 6742 is a mid-range data-concentrating and switching node capable of supporting 32 terminal ports and 10 dedicated network links. The product can also function as a T1 concentrator/feeder.

The 6745 is a means to high-performance data-concentrating and switching node that supports 192 terminal ports and 16 individual networking links. The product offers a three-nested code supporting optional power and central logic redundancy.

The company has also announced the **9300 View**, a network interface to IBM Systems Network Architecture or IBM NetView environments. The 9300 Series is a personal computer-based integrated network management system designed for small to medium-size networks.

Codex Corp., Maresfield Farm, 7 Blue Hill River Road, Canton, Mass. 02021. 617-364-2000.

NEC America, Inc.'s Data and Video Communications Systems Division has announced a network control and management system.

The **NCMS/PC 386** (Network Control and Management/Personal Computer) can reportedly monitor dial, digital and analog lines and will provide users with an interface to IBM's NetView. List pricing for NCMS/PC 386 systems ranges from \$16,000 to \$49,000.

NEC America, 110 Rio Robles, San Jose, Calif. 95134. 408-433-1250.

Cablenet Systems, Inc. has announced the **LAN Specialist**, a network management and troubleshooting tool for Ethernet and 802.3 networks.

The unit is connected to the network from any receiver on the network, and user interface is provided through an RS-232 port for connection to Digital Equipment Corp. VT220 or compatible terminals. It also interfaces with IBM Personal Computers or compatibles.

The LAN Specialist costs \$7,995.

Cablenet Systems, P.O. Box 6257, Rochester, N.H. 03867. 603-332-9400.

Universal Data Systems has introduced the Model 3224, a serial port expansion card designed for the IBM PC/XT/AT and compatibles. The card provides up to 16 serial ports, each with a built-in 16K buffer, allowing for simultaneous data transmission over dial-up or private two- or four-wire circuits. The receiving modem automatically adjusts to the speed of the incoming signal. Both configurations offer AT command set compatibility, level 4 MMIP for error-free data and a choice of synchronous or asynchronous operation.

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Network services

AT&T has announced an option for its Accutel T1.5 Service that makes sure circuits between the carrier's network serving offices follow geographically separate paths. AT&T said.

The Special Routing Option guarantees that an earthquake or other event that severs one link will not affect a second link that is being used as a backup. If routes cannot be completely separated, AT&T will advise the customer of how many miles or serving offices the two routes have in common.

A fixed and per-mile charge will be determined by air mileage between serving offices at either end. There is also a one-time charge of \$600 per circuit.

AT&T National Product Center, Speedwell Ave., Morris-Town, N.J. 07960. 800-247-1212.

Customer-premise equipment

Optilink Corp. has announced a direct digital interface (DDI) option designed to allow an Optilink Timespan digital loop carrier remote terminal to connect directly to a digital central-office switch via T1 spans in.

The Timespan DDI option supports the Mode I (transconcentrated) and the Mode II (concentrated) digital switching interfaces, as defined by Bellcore and known as the AT&T SLC-096 interface. The interface serves as many as 96 lines through either three or five span lines.

The Optilink DDI option is scheduled for delivery in the fourth quarter. The product can

be retrofitted on all Timespan 128 systems purchased since December 1986; retrofitting charges range from \$2,600 to \$4,000.

Optilink, P.O. Box 750699, Petaluma, Calif. 94975. 707-795-9444.

Cestigram Corp., a supplier of voice-messaging systems, has introduced VoiceNet-VS, a messaging system specifically designed for branch offices of Fortune 500 companies and small businesses.

The product can support a maximum of 200 users and is available in configurations of two, four, six or eight ports and three, six or nine hours. Features include Reception II, an automated-attendant software enhancement that answers and forwards calls 24 hours a day, and 1,024 user-programmable classes of service. The product reportedly offers integration with most major telephone switches and includes built-in hacker protection.

VoiceNet-VS is priced from \$17,400.

Cestigram, 4415 Fortran Court, San Jose, Calif. 95134. 408-942-3500.

Links

Boston Software Systems, Inc. has added IBM LU6.2 Advanced Program-to-Program Communications to Boston's Access, the company's interface software. This interface reportedly allows users to connect any application directly into an LU6.2 session without reprogramming either the application or the session.

According to the vendor, the microcomputer-based software

works by reading data directly from the screen buffers of one application and inserting the information into the keyboard buffers of another.

The program operates in unattended mode and runs on IBM Personal Computers, Personal System/2 and compatible systems with DOS 2.0 or higher.

Boston Access costs \$550 per copy, and current customers can obtain the LU6.2 module for \$55.

Boston Software Systems, 76 Whitney St., Sherborn, Mass. 01770. 508-653-5105.

A data controller said to enhance IBM Systems Network Architecture (SNA) access to mainframe computers has been announced by Informer, Inc.

According to the company, the Model 371E serves as a synchronous port expander for SNA and IBM Synchronous Data Link Control (SDLC) networking applications by concentrating multiple SDLC data streams into single front-end command ports.

The unit is contained in a 3/4- by 16W- by 15V-in. enclosure that is appropriate for desktop or office environments.

All ports are configured under software control by the user at installation using the integral control console port and are stored locally on disk for ready configuration in the event of a power failure.

The Model 371E data controller is available in two versions: An eight-port configuration costs \$5,995, and a 14-port controller costs \$9,995.

Informer, 12781 Palisade Drive, Garden Grove, Calif. 92641. 714-891-1112.

Local Data, Inc. is shipping a software package with its DataLynx/3174 BSC protocol converter. The software is also available to current DataLynx users as a product update, the company said.

Additional features include asynchronous pass-through capabilities that reportedly allow asynchronous terminal users to access either IBM mainframes through protocol conversion or ASCII minicomputers via straight ASCII pass-through mode. The product also has a simplified user interface.

The DataLynx/3174 protocol converter is available in four port to 32 port models and is field-upgradable. Pricing ranges from \$3,000 to \$10,000.

Local Data, 2771 Plaza Del Amo, Torrance, Calif. 90593. 213-320-7126.

Interlink, Inc. has introduced an IBM Personal System/2 Transmission Control Protocol/Internet Protocol (TCP/IP) workstation that allows any IBM PS/2 Model 50, 60 or 80 to simultaneously communicate with hosts and Novell, Inc. Netware

file servers.

Designated the NI9210, the unit also offers remote logon, file transfer capability, Telnet terminal emulation, electronic mail and other functions.

The NI9210 costs \$895.

Interlink, 155 Swanson Road, Boxboro, Mass. 01719. 617-263-9929.

Infobridge Solutions, Inc. has announced a server that offers up to 16 concurrent sessions for each user of a single IBM 3270 display station.

Called the IB/3274X Server, the product is said to be an entry-level implementation of the company's IB/System 3000 family of computer-aided soft-



Atex 150 integrates widely dispersed Ethernet subsets

ware engineering products. The server provides an intelligent interface between IBM 3274 control units and host systems and can support up to 16 3274 units whether locally or remotely attached.

A maximum of 256 display stations can be connected through a single server. The IB/3274X is priced from \$25,000.

Infobridge Solutions, 1601 Saratoga-Sunnyvale Road, Cupertino, Calif. 95014. 408-255-5523.

Novell, Inc.'s Netware Gateway X.25 and Netware X.25 Extended Gateway are now available. At \$550, the Netware

Continued on page 107

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Continued from page 105

X.25 Gateway supports access to as many as 32 concurrent ASCII host sessions over eight assigned local-area network workstations.

The Netware Extended Gateway was designed to support simulation of up to 254 ASCII sessions on 100 workstations. It is priced at \$1,150.

Another product is the PCOX/X.25 Extended Network Adapter, which is required for the X.25 Extended Gateway. It supports connection to 256 X.25 virtual circuits on an IBM Personal Computer, PC AT or compatible. The PCOX/X.25 Extended Adapter costs \$1,645.

Novell, 122 E. 1700 South, Provo, Utah 84601. 801-379-5900.

French Technology Press Office, Inc. has announced Databridge, developed by Come-dia of Teyran Cedex, France.

The product allows users to import mainframe and minicomputer files into a microcomputer environment. It runs across a variety of hardware platforms, including IBM, Digital Equipment Corp., and Hewlett-Packard Co., and integrates into most spreadsheet and database applications available for IBM Personal Computers, Personal System/2s and compatible systems.

Features reportedly include user-defined mapping capabilities and automatic summation of source and target files.

Databridge costs \$99.95.

French Technology Press Office, Suite 601, 401 N. Michigan Ave., Chicago, IL 60611. 312-223-1235. Product reference number 88-07-069.

Connect Tech, Inc. is offering a series of intelligent asynchronous-communications adapter boards that allow serial serial devices to be connected to an IBM Personal Computer, PC XT, AT or compatible.

The Intellicon-2, Intellicon-4 and Intellicon-8 incorporate two, four or eight RS-232 serial ports, respectively. Features reportedly include simultaneous data rates of up to 19.2K and 38.8 Kbit/sec. Drivers are available for IBM PC-DOS, SCO Xenix 286 and 386 and other operating environments.

The boards require one full-length expansion slot, one available interrupt request line and one available 64K-byte segment in the first megabyte of memory address space.

The Intellicon-2 costs \$395, the Intellicon-4 costs \$695 and the Intellicon-8 costs \$995.

Connect Tech, No. 20, 340 Woodlawn Road W., Guelph, Ont., Canada, N1H 7K6. 519-836-1291.

Canon U.S.A., Inc. has announced two facsimile machines, the Fax-705 and the Fax-270. Both units reportedly allow

images to be scanned and transmitted in as many as 64 shades of gray and incorporate a proprietary error-diffusion method, the vendor said.

The FAX-705 is said to transmit at nine page/sec. and costs \$3,995. The FAX-270 with a built-in telephone offers 12 page/sec. transmission and is available for \$2,495.

Canon U.S.A., 1 Canon Plaza, Lake Success, N.Y. 11042. 212-688-1200.



Canon Fax-270 prints 64 shades of gray

Datamax, Inc. has introduced a series of its communications software that reportedly links Datacom Corp. VAX and PDP-11 systems to the recently announced IBM Application System/400 machine.

Hasp Plus includes several additional features such as automatic route-back functions and remote job entry networking capabilities. According to the vendor, throughput rates can be sustained over multiple streams at speeds up to 64K bps/sec. The AS/400 system requires IBM standard subsystem communications software and the IBM Remote Job Entry facility communications software for the DEC link. DEC system requirements include a standard DEC communications board.

Hasp Plus is priced from \$3,500 on a Microvax and from \$5,500 on a VAX. Datamax, P.O. Box 1728, Eugene, Ore. 97440. 503-687-2500.

Wang Laboratories, Inc. has announced a Transmission Control Protocol/Internet Protocol (TCP/IP) networking product.

Called the Wang VS TCP Interconnect, the product was designed to enable VS systems to communicate in multivendor networks that use the TCP/IP standard. The system is said to support electronic mail and file transfer and provide remote logon services to a variety of non-Wang host systems, including IBM and Digital Equipment Corp. machines.

The Wang VS TCP interconnect can be licensed for \$5,500 to \$15,500, depending on system configuration.

Wang, One Industrial Ave., Lowell, Mass. 01851. 459-5000.

Applied Creative Technology, Inc. has introduced a modular peripheral access system that was designed to form a distributed peripheral sharing network.

parameters and can be specified by the programmer in the same manner and syntax as an IBM MVS call macro. The license fee for an IBM 3090 class system is \$78,000.

Advanced Program Exchange Laboratories, One Apple Hill, P.O. Box 8297, Natick, Mass. 01760. 508-651-0099.

A software package that links personal computers to minicomputer systems has been announced by Point 4 Data Corp.

Called PC Answer, the product was designed to connect IBM and compatible Personal Computers, PC XT's and ATs to Point 4 computer systems. According to the vendor, the software allows information on the mini-computer to be transferred to the PC to be used in conjunction with various application packages. These include Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s Database II and III and several other word processing and graphics programs running under Microsoft Corp.'s MS-DOS. Data can be transferred bidirectionally at speeds up to 19.2K bps/sec.

PC Answer costs \$1,880.

Point 4, 15442 Del Amo Ave., Tustin, Calif. 92680. 714-259-0777.

3X USA Corp. has announced Mail-Server, a communications software package designed for sales staff and executives who frequently use laptop computers.

parameters and can be specified by the programmer in the same manner and syntax as an IBM MVS call macro. The license fee for an IBM 3090 class system is \$78,000.

The program is said to incorporate electronic mail, file transfer and bulletin-board messaging functions. Features include a mailing and distribution list, a text editor and unattended send and receive capabilities. The software emulates most asynchronous terminals, the vendor said, including Digital Equipment Corp.'s VT220, VT100 and VT52 displays.

Mail-Server costs \$195.

The company has also introduced 3X-Link, an unattended file transfer utility.

The program reportedly performs file transfer at speeds up to 115.2K bps/sec. between microcomputers with background print queues on a remote printer. The software connects two personal computers via RS-232 ports and universal cable and allows users to copy programs or files in any format between systems, the vendor said. A minimum of 256K bytes of random-access memory is required on each microcomputer.

3X-Link costs \$149 and includes the universal cable and two disks in either 5½-in. or 3½-in. format.

3X USA, One Executive Drive, Fort Lee, N.J. 07024. 201-592-6874.

A networking software that connects Digital Equipment Corp. VAX machines to IBM systems has been announced by Joiner Associates, Inc.

Dubbed Janet NJE V3.3, the

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product runs under VMS 4.2 and higher. Upgraded features reportedly allow system managers to install Jnet on any disk in the system rather than being restricted to the system disk. The company claims that installation time can be decreased, particularly in cluster configurations, by selectively installing only portions of the product.

Other functions include file queuing by size and support for courtesy copy lists and personal names in VMSmail.

Prices for net NJE V3.3 range from \$1,500 on the DEC Vaxstation to \$51,000 on the DEC 8978 Vaxcluster.

Joiner Associates, P.O. Box 5445, Madison, Wis. 53707. 608-238-8637.

Network Solutions, Inc. has released Version 1.7 of its Open-Link for the IBM MVS (OL/MVS) data communication package.

The product provides Ethernet support and program-controlled file transfers and was initially designed to support MVS connections to the Defense Data Network under the Transmission Control Protocol/Internet Protocol communications suite, the vendor said.

Version 1.7 provides the customer with an interface to 802.3 Ethernet local-area networks via the OL/1220, a high-performance channel control unit, according to the company.

This interface enables the miniframe to communicate over CCITT X.25 wide-area networks, Ethernet LANs or both simultaneously.

Open-Link 1.7 for IBM systems costs \$36,650 for a standard hardware and software configuration.

Network Solutions, 8229 Boone Blvd., Vienna, Va. 22180. 703-442-0400.

A packet assembler/disassembler (PAD) system that reportedly reduces the cost of running CCITT X.25 packet data networks by supporting multiple protocols over a single X.25 link has been announced by Micom Systems, Inc.

The Micom Box Type 3 Dual Protocol PAD is based on the company's modular Micom Box architecture and houses one or two interchangeable software cartridges. The product provides connection to a public or private X.25 network at maximum speeds of 64K bit/sec. for a combination of up to 74 non-X.25 asynchronous or synchronous data streams. Synchronous protocols include IBM 3270 Binary Synchronous Communications and Systems Network Architecture.

The Micom Box Type 3 Dual Protocol PAD is priced from \$4,795 to \$6,245.

Micom Systems, 4100 Saticoy St., Los Angeles Ave., Simi Valley, Calif. 93063. 805-583-8660.

Plexcom, Inc. has announced the Plexnet-II Concentrator, which implements 10M-byte Ethernet over unshielded twisted-pair cabling systems, the company said.

The product provides support for up to eight hot modules with one retiming module and one master module in a single cabinet — a total of 10 slots. When fully configured with eight modules, the unit can reportedly support 64 twisted-pair cable links to transceivers. Modular RJ45s are provided on a proprietary data punchdown to connect the



Micom Systems' Micom Box Type 3 Dual Protocol PAD

concentrators to the cross-connect field.

Plexnet-8 Concentrator with 64 ports, nine 8020 modules, power supply and chassis costs \$9,945.

Plexcom, 65 Moreland Road, San Jose, Calif. 95065. 805-522-3333.

Network Software Associates, Inc. has unveiled an enhanced version of its AdaptSNA 3270 emulation software. The company has also announced a price decrease on the product, now available for \$245. Original pricing was set at \$585.

The software runs on IBM and compatible systems, including Personal System/2 and laptop machines. It was designed to provide IBM 3270 PC-to-host communications over coaxial cables, Synchronous Data Link Control or asynchronous connections in an IBM Systems Network Architecture network.

Product enhancements are said to include a script language for unattended file transfer functions and support for full color.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653. 714-768-4013.

Software that connects Apple Computer, Inc. Macintosh machines with Unix, Microsoft Corp. Xenix and other operating system environments is now available from **Communications Research Group**.

Called Machblast, the product reportedly includes Digital Equipment Corp. VT52, VT100 and VT220 terminal emulation capabilities and allows Macintosh users to access other computers via the standard Apple Human Interface. Background operations and Macintosh support are also included.

Machblast costs \$195 and runs Macintosh Plus, Macintosh SE and Macintosh II systems.

Communications Research Group, 5615 Corporate Blvd., Baton Rouge, La. 70808. 504-923-0888.

An IBM 3270 micro-to-mainframe emulation board that is compatible with IBM and Digital Communications Associates, Inc. Iarna hardware has been announced by **Quintech Corp.** Called Mainlink II, the

U.S. Distributor for Intelligent Control Technology, 453 Kings Road, Clifton Park, N.Y. 12065. 518-877-8552.

The Imaging and Graphics division of Gould Electronics, Inc. has announced that the company's IP90900 Series Image Processor will now be supported on Sun Microsystems, Inc. Series-3 workstations.

The IP90900 will connect to the Series-3 via Gould's optimized interface and will reportedly provide data transfer speeds of 6M bit/sec. The Gould processor will display high-resolution monochrome and color images obtained from a variety of sources and is especially suited for image exploitation, medical imaging, remote sensing and imaging-interactive applications.

The minimum Sun system requirements for the IP90900 include a Sun-3 series CPU, 4M bytes of memory, one 141MB disk drive, a 1/4-in. tape cartridge and one VME slot.

The IP90900 is priced from \$40,000 to \$150,000, depending on options selected.

Computer Electronics Imaging and Graphics Division, 46360 Fremont Blvd., Fremont, Calif. 94538. 415-498-3296.

A set of communications tools for C programmers has been introduced by **Nordtech Research, Inc.**

Called the Asynchronous Communications Toolbox, the product offers a data line monitor, program file transfer and reconfigurable port parameters, supporting as many as four ports with standard hardware, the vendor said. The toolbox runs on IBM Personal Computers, PC ATs and compatible sys-

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tems and is listed at \$45.

Nordtech, P.O. Box 1011, Fairfield, Iowa 52556. 800-852-7766.

Fibronics International, Inc. has announced the Knet Communications Software system for Siemens Information Systems, Inc. BS/3000, Hitachi Ltd. VOS3 and Fujitsu America, Inc. F4 mainframe computers.

The software provides Transmission Control Protocol/Internet Protocol standard applications for file transfer and remote logon, the vendor said, and also allows access to the mainframe via Ethernet local-area networks which were used in conjunction with Fibronics' communications controllers.

The software is priced from \$4,000 to \$80,000.

Fibronics International, Communications Way, Independence Park, Hyannis, Mass. 02601. 508-778-0700.

Teleon Communications, Inc. announced that its B100PC Integrated Services Digital Network (ISDN) communication processor can now communicate with hosts, minis and personal computers via Crosstalk MK4 communication software from Crosstalk Communications/DCA in Roswell, Ga.

The B100PC plug-in board reportedly provides the ISDN Basic Rate Interface for IBM Personal Computers and compatibles and has been enhanced to include several new voice functions, the vendor said.

The B100PC costs \$1,695. Crosstalk MK4 is priced at \$245 and is available from both Crosstalk and Teleon.

Telesis Communications, 2 Meridian Road, Eatontown, N.J. 07724. 201-389-5700.

Plantronics Futurecomm, Inc. has announced a 10-port packet assembler/disassembler (PAD) switch and concentrator.

Microturbo supports as many as 10 user-definable ports on one card while permitting each port to be individually configured as a PAD port, a protocol conversion port or an X.25 port—all simultaneously and within the same unit, the vendor said.

Microturbo carries a list price of \$2,950.

Plantronics Futurecomm, 7630 Hayward Road, Frederick, Md. 21761. 301-662-5901.

Wang Laboratories, Inc. has enhanced its VS Access/3270 software package.

The product reportedly enables 3270 terminals to access applications on a Wang VS system.

Release 2.0 reportedly provides support for the IBM MVS, VM and DOS/VSE operating systems and also supports large 3270 network environments.

VS Access host software is listed from \$2,500 to \$4,000.

License fees for VS Access/3270 software range from \$250 to \$1,000.

Wang, 1 Industrial Ave., Lowell, Mass. 01851. 508-459-5000.

AST Research, Inc. has announced software that provides IBM 5250 terminal emulation support in an IBM Application System/400 minicomputer environment, the company said.

The software will work with several existing IBM System/34, 36 and 38 products, and interested users can reportedly download the new products from the "5250 interest" section of the AST bulletin board system at no charge. The bulletin board telephone number is 714-852-1872.

AST Research, 2121 Altos Ave., Irvine, Calif. 92714. 714-563-1333.

Laguna Laboratories, Inc. has announced database access software that facilitates both data integration and data exchange between IBM Personal Computers and the IBM Application System/400.

The menu-driven PC Connect/400 package reportedly features a context-sensitive Help screen and windows. Bidirectional printing, security features and unattended file transfers are also provided.

PC Connect/400 is priced from \$1,000 to \$2,000 depending from hardware platform.

Laguna Laboratories, 17192 Gillette Ave., Irvine, Calif. 92714. 714-724-0500.

A microwave system for IEEE 802.5 token-ring local-area network applications is now available from Microwave Networks, Inc.

The Microtak Token-Ring Radio reportedly interfaces directly to a 4-MB bit/sec. token-ring network to provide all the network advantages of LAN microwave links.

The product is priced from \$10,700.

Microwave Networks, 10795 Rockley Road, Houston, Texas 77099. 713-495-7123.

Microsystems Engineering Corp. has released Mass-11 Supercom, a product that provides seamless communications between IBM Personal Computers and Digital Equipment Corp. VAX Mass-11 systems, the company said.

The product allows users to transfer VAX files to the PC for editing; the completed document is then automatically returned to the VAX directory. A modem and direct-connect hookups are required for operation.

Mass-11 Supercom costs \$1,95 per PC. A separate VAX module must also be purchased, with prices ranging from \$95 to \$2,875.

Microsystems Engineering,

Suite 400, 2400 W. Hassell Road, Hoffman Estates, Ill. 60195. 312-582-0111.

Rabbit Software Corp. has introduced a family of advanced local-area network gateway products, including an enhanced version of its Rabbitgate remote IBM System Network Architecture (SNA) product.

Called Rabbitgate II, the product is available in several versions that enable a user at a single DOS workstation or on a LAN to connect to SNA, CCITT X.25, Binary Synchronous Communications or distribution functional-terminal coaxial miniframe systems simultaneously from multiple windows. Graphic support is also offered.

Pricing for the product line ranges from \$2,395 to \$7,995, depending on configuration, and the products are available immediately.

A Rabbitgate II Micro Channel version for IBM Personal System/2 users has also been announced.

Rabbit Software, Great Valley Corporate Center, 7 Great Valley Pkwy., E., Malvern, Pa. 19335. 215-647-0440.

A package that converts standard Digital Equipment Corp. Cobol to IBM Cobol on either the IBM Application System/400, System/36 or 370 series of processors has been announced by Arkansas Systems, Inc.

The product, referred to as DEC Cobol to IBM Cobol, is available for either batch or online processing and is priced from \$2,000 to \$4,000, depending on CPU.

Arkansas Systems, 8901 Konza Road, Little Rock, Ark. 72205. 501-227-8471.

Niwot Networks, Inc. has introduced two plug-in cards designed to bridge Novell, Inc. Network-based local-area networks with a wide-area network over 1.5M bit/sec. T1 facilities.

Designated the AT/T1 Network Interface and AT/Sync, the boards reportedly provide direct connection to owned or leased 1.5M bit/sec. T1 lines from IBM Personal Computer AT bus compatible computers running in a Network environment.

The AT/T1 card is said to comply with Bell Publication 624/1 regarding transmission over long-haul facilities. AT/Sync permits transmission at up to 1.5M bit/sec. over an RS-423 full-duplex clock and data connection.

The AT/Sync is slated for availability in the first quarter of 1989.

Niwot, P.O. Box 3153, Boulder, Colo. 80307. 303-444-7765.

A data transfer system that links Apple Computer, Inc. Macintosh machines to IBM mainframes has been announced by Performance Software, Inc.

Called Macmasterlink, the software reportedly allows the transfer of text files between the two systems. Features include access to VSAM and mainframe spooled files, select and omit capability on both records and fields and translation of mainframe data into Macintosh formats.

The product also permits data transfer between Macintosh computers and IBM Personal Computers, PC XT's, ATs and Personal System/2s, using the IBM mainframe as an intermediate.

Macmasterlink costs \$9,500 for a DOS/VSE site license and \$13,500 for an MVS site license.

Performance Software, 575 Southlake Blvd., Richmond, Va. 23236. 804-794-0102.

An optical transmission device designed to connect Ethernet local-area networks has been announced by Laser Communications, Inc.

The **Lace L00-16** full-duplex data link offers atmospheric laser transmission of Ethernet signals at speeds of 10M bit/sec. over distances of up to 1 km. The link does not require Federal Communications Commission licensing and costs \$14,190.

Laser Communications, Suite F, 1848 Charter Lane, Lancaster, Pa. 17605. 800-527-3740.

Microshare Corp. has announced Version 3.2 of the Microshare Basic (MSB) operating system. The company manufactures hardware and software products that allow users to connect terminals to IBM Personal Computer AT's and Personal System/2 machines and to AT-compatible systems.

The latest release of the operating system reportedly allows file transfer between MSB hosts and intelligent workstations, including unattended remote computers. The software performs automatic data verification and retransmission and provides a proprietary disk partition to aid programmers in performing disk reads and writes.

MSB 3.2 costs \$895 plus shipping and installation charges.

Microshare, Suite 400, 205 W. 76th St., Salt Lake City, Utah 84101. 801-366-6575.

Laguna Laboratories, Inc. introduced 123/X, a product that supports data transfer between Lotus Development Corp.'s 1-2-3 and Symphony data files and the IBM System/36 or 38.

The menu-driven application reportedly allows the user to bring the System/36 or 38 down directly into the WK1, WR1, WKS or WRK format files, and will allow personal computer spreadsheet reports to be printed on any System/36 or 38 printer. The product is compatible with all IBM 5251 emulation boards.

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123X costs \$250.

Laguna Laboratories, 17192 Gillette Ave., Irvine, Calif. 92714. 800-331-2153.

BICC Data Networks, Inc. has introduced the Isolan Remote Bridge, a product that reportedly links two local-area networks together via a wide-area network.

The product utilizes standard

dial-up telephone service, leased lines, packet switching networks and Integrated Services Digital Network services. Simultaneous transmission is provided on four 19.2K bit/sec. lines or on two 56K bit/sec. connections. The product must be used in pairs, and each half-bridge includes Ethernet Attachment Unit Interface and channelnet interfaces, as well as RS-232 and RS-

499 ports for wide-area connections.

The Isolan Remote Bridge is protocol-independent and is priced at \$12,600 per pair.

BICC, 1800 W. Park Drive,

Westboro, Mass. 01581. 617-

898-2422.

Icet Corp.'s Network Systems Division has expanded its micro-to-mainframe product line

with the announcement of a coaxial IBM 3270 emulation board with multimode capabilities.

The Shortcut board is reportedly delivered in a half-slot configuration and offers three software upgradable configurations. The basic Shortcut package consists of a board and cut mode software capable of supporting a single-host session. Terminal emulations supported

by the software include the IBM 3278 Models 2, 3 and 4 and the IBM 3279 Models 2A and 2B. The product provides 16K bytes of on-board random-access memory.

Shortcut pricing ranges from \$795 to \$1,495.

Icet Network Systems Division, One Apple Hill, Natick, Mass. 01750. 800-343-0515.

Protocol converters

Black Box Corp. has introduced a single-port protocol converter. The PQ-SP was developed to connect IBM System/34 and 36 hosts to local or remote IBM Personal Computers or Apple Computer, Inc. Macintosh PCs without using RS-232 communications ports.

The converter reportedly accepts twin-axial cable from the IBM host and RS-232 cable from attached peripherals and provides complete emulation of IBM 5291 and 5251 terminals, Models 1 and 11.

The PQ-SP costs \$1,495.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241. 412-746-5530.

Electronic mail

Coker Electronics has introduced Type-FaxForward, the company's latest addition to its family of electronic mail and file-transfer communications software products.

The product reportedly enables a personal computer without a facsimile board to utilize a remote PC's facsimile board to perform remote fax-forwarding functions.

Type-FaxForward costs \$129.

Coker, 1430 Lexington Ave., San Mateo, Calif. 94402. 415-573-5515.

Modems/ Multiplexers

Racal-Milgo has introduced the DSU 500 RD and the DSU 556 RD basic series. The low-cost digital-access devices were designed to give users a low-cost entry to AT&T's Datapath Digital Service (DDS), the company said.

The DSU 500 RD reportedly supports synchronous data transmission in point-to-point and multi-point configurations over full-duplex trunks at DDS rates of 2.4K, 4.8K and 9.6K bit/sec. The DSU RD 556 is said to provide the same features except that it transmits at a straight 56K bit/sec. speed.

Both units can be upgraded to allow control by Racal-Milgo's CMS 2000 series network management systems and provide access to DDS secondary channels.

The DSU 500 RD is priced at \$850, and the DSU 556 RD is

Continued on page 114

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makes it powerful enough to support 1344 IBM, compatible, or Macintosh personal computers with no loss of performance. In PC Magazine tests, LANSTAR provided "excellent throughput, carrying data for thousands of feet—2,000 feet from the hub, to be precise."

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For a copy of the entire PC Magazine article and complete information on Meridian LANSTAR, stop by COMDEX Booth 2000 or call 1-800-328-8800.



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Continued from page 110

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Racal-Milgo, P.O. Box 407044, Fort Lauderdale, Fla. 33340. 305-475-1601.

An internal modem card designed for the IBM Personal System/2 Models 50, 60, 70 and 80 has been announced by Teletel Corp.

An extension of the company's Trailblazer Plus product line, the Trailblazer Plus PS reportedly fits into a Micro Channel Architecture expansion slot to support error-free asynchronous communications over ordinary telephone lines. The unit supports transmission speeds of as fast as 19.2 bit/sec. The modem is available alone or bundled with Hypercess data communications software from

Hilgraeve, Inc.

Trailblazer Plus PS costs \$1,295 with Hypercess software, \$1,295 without. Teletel, 1345 Shorebird Way, Mountain View, Calif. 94043. 415-969-5000.

Astrocom Corp. has announced the release of multiplexers that use single-end multiplexing to link one site to as many as 20 separate remote locations.

The #1100 unit works to a D channel bank. The #2200 transmits data directly into the DDS network through an integrated data service unit/channel service unit and can also be used for point-to-point multiplexing, the vendor said.

Both models have 20-port capacity with modular upgrades available in five-port increments. Other features include

asynchronous secondary channels for network management and diagnostics and channel data rates from 2.4K to 19.20K bit/sec.

The 8100 and 8200 are priced from \$3,350.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55107. 612-227-8651.

Zenith Data Systems has announced a 2.4K bit/sec. internal modem for its new line of Supersport and Supersport Plus 286 portable computers.

Designated the Model ZA-181-24, the modem is reportedly compatible with the Hayes Microcomputer Products, Inc. 2400 command set, Bell 212A and 103 and CCITT V.22 bis protocols. Other features include autodialing, Touch-Tone or

rotary-pulse dialing, software-programmable registers and a 40-char. command buffer. The product is also compatible with the company's Z-181 and Z-182 personal portable computers.

The Model ZA-181-24 costs \$449. Zenith, 1000 Milwaukee Ave., Glenview, Ill. 60025. 312-699-4839.

Telenetics Corp. has announced the availability of 1,200 and 2,400 bit/sec. stand-alone and rack-mount modems. The modems may be upgraded at any time to V.32 9.6K bit/sec. transmission rates. The TC921S/R Series is CCITT V.22 bis, AT&T 212A or 103 and include automatic adaptive equalization for consistent performance. One upgradeable model will reportedly match all existing application requirements.

The TC921S/R at 9.6K bit/sec. costs \$1,495.

Telenetics, 5109 E. La Palma Ave., Anaheim, Calif. 92807. 714-779-2766.

A 9.6K bit/sec. multiplexed dial-up modem is now available from Teletel Corp.

The T1000 can perform at 300, 1,200, 2,400 or 9.6K bit/sec. and can operate using any data communications software package that supports the Hayes Microcomputer Products, Inc. V-series or the Teletel Trailblazer command set.

The T1000 costs \$795. An optional serial is available for \$15.

Teletel, 1345 Shorebird Way, Mountain View, Calif. 94043. 415-969-3800.

Cabling

An IBM cabling system for data and voice transmission has been announced by Alpha Wire Corp. It includes Type 1 plenum and nonplenum data cables, Type 2 plenum and nonplenum data and voice cables, Type 6 shielded two-pair office-grade data cables and Type 9 two-pair plenum cables. All reportedly meet IEEE 802.5 requirements.

Pricing starts at approximately 50 cents per foot.

Alpha Wire, P.O. Box 711, Elizabeth, N.J. 07207. 201-925-8000.

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PC GRAPHICS



MIKE GUTHRIE

PCs gain ground as CAD vehicles

BY CHARLES BERMAN

Signode Industries, Inc., in Glenview, Ill., reached a crossroads two years ago in its use of computer-aided design (CAD).

At that point, says Rudy Kallinger, vice-president of research and engineering, the company, which manufactures strapping and banding machinery, needed more CAD capability in its engineering department and had to decide whether to expand mainframe CAD operations or to introduce elements of personal computer CAD.

Noting the dramatic change in PC capabilities and the lower price/ performance of PC CAD, the company chose the best of both.

It continued to use its ComputerVision Corp. system — a CDS 4001 mainframe fronted by six

Imastriview workstations running CADDIS 4X software — for infinite element modeling and other complex design tasks. But it brought in 10 Compaq Computer Corp. Deskpro 386 PCs running Computer Associates' Personal Designer to perform basic tasks once handled by the larger system.

More and more, users are finding that while PCs lack the power of mainframes or 32-bit graphics workstations, they, and the software designed to run on them, have matured sufficiently to handle many jobs.

According to Carl Machover,

whose White Plains, N.Y.-based Machover Associates monitors graphics trends, PCs are largely responsible for the recent surge in CAD shipments. In the past five years, 400,000 PC CAD systems have gone into operation, he says, while only 120,000 conventional workstations were sold since 1970. Dataquest, Inc., a market research firm in San Jose, Calif., estimates that 226,000 PCs will be sold for CAD purposes in 1988, up 58,000 from 1987.

Many of those units are turning up in places where, until recently, the very idea of designing

on a microcomputer would have evoked scorn.

"The biggest source of prejudice has been the traditional CAD community," says Kathy Hale, an industry analyst for Dataquest. "They don't believe that you can do serious CAD on a little computer."

Some still don't, but according to Charles Foundyler, president of Daratech, Inc., a PC CAD market research firm in Cambridge, Mass., those ranks are shrinking.

Daratech estimates that about 35% of Fortune 500 CAD users work with PCs and that micros are responsible for 23% of all user-invested CAD dollars. These numbers have doubled in each of the last two years, with a projected growth of 20% per year for the next five years.

Part of the reason for this increase is price. An average CAD-equipped PC tops out at around \$12,000, while a more sophisticated workstation-based system falls between \$30,000 and

INSIDE

Exchanging Pictures

CGM standard extends sharing among systems.
Page 122.

Quick Draw

Redraw time too slow? Try display list processing.
Page 125.

Roster of PC Players

A comprehensive list of what's available in PC CAD software.
Page 127.

Berman is a free-lance writer based in Gladstone, Ore.

PC CAD

CONTINUED FROM PAGE 115

\$60,000. A mainframe system can cost from \$50,000 to \$70,000 per user. A plotter, costing from \$1,500 to \$25,000, needs to be added in either case.

"It's the old story of the kid who wants to drive a Ferrari, but his dad will only get him a Volkswagen. Engineers want the slickest machines, but their bosses want to buy smaller and get them PCs," Fournier says.

Beyond that, however, is the fact that PCs and PC-based CAD software programs are now capable of holding their own in high-powered computing. PC CAD phenom is dissipating as larger systems users see what the "little weenie machines" can do.

While early versions of PC CAD were best suited for educational applications, Machover says, hardware and software improvements have now brought the category to a point at which PC CAD "dominates the entire two-dimensional market, and is seriously considered for three-di-

DOS, the 640 kilobyte random-access memory) limit and how big the file can be," Hale says. While all the functions of a turn-key system are rapidly moving onto PCs and most users are happy with the results, she notes, PC CAD probably would not be the best choice for a task such as integrated circuit design.

Some specific areas in which PC CAD comes up short are sophisticated shading and speed of execution, according to Terry Woblers, a computer graphics consultant based in Golden, Colo.

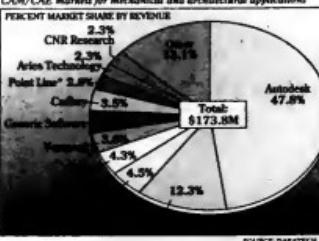
"It can," he says, "take a long time to complete a simple operation, like taking a minute to redraw a 1-Mbyte file." Woblers agrees that many of PC CAD's limitations are in the mind of the user, especially users from the mainframe world.

"A lot of large companies still don't take programs like AutoCAD or Versacad seriously," he says. "For many, [moving to PC CAD] will be a matter of talking to someone who is using a PC in a practical application to see what it can do. But some will feel that [CAD] will always take a mainframe, no matter what."

Richard Fischera, a Groton, Mass.-based independent consultant specializing in graphics systems technology, is quick to point out the limitations of PC CAD when compared with "supergraphic" workstations, like those available from Stellar Computer, Inc. and Ardent Computer Corp., or conventional CAD workstations, such as those from Sun Microsystems, Inc., Apollo Computer, Inc. and Silicon Graphics, Inc.

"There are some things that have implications beyond just running the same applications faster," he says. "There are some things that are not doable on a PC, that are still in the mainframe and supercomputer class. This class of machine now offers a higher order of magnitude, with 400,000 and up vectors per second, as compared with

Leader of the pack
Autodesk makes almost half of the software revenue in the PC CAD/CAM/CAE markets for mechanical and architectural applications



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100 for a PC. They have very high-speed internal buses, while there are limits to what you can get through a PC bus now."

According to Fischera, high-end workstations, such as the ones from Stellar and Ardent, cost about \$100,000 and are capable of running applications five to 20 times as fast as the highest performance PCs.

Even the lower end of the CAD workstation spectrum, which Fischera says is defined by a price range of \$20,000 to \$40,000, offers a higher graphics application performance than a high-end Compaq Computer Corp. machine, although performance is similar for applications that do not use large amounts of memory.

One of the biggest differences between PCs and workstations, he points out, is the interface, noting, "32-bit machines have very good user interfaces with effective windowing systems. The PC world is just starting to do that [with IBM and Microsoft Corp.'s Presentation Manager]."

However, areas in which the higher-powered and more specialized machines shade include molecular modeling, computational chemistry and detailed weather analysis — not exactly everyday business uses, he says.

Although Fischera gets excited talking about pricey workstations, he gives PC's their due, noting that a new class of potential users will develop when prices drop.

"PC CAD will dominate the industry," he maintains. "These exotic functions are sexy, but 80% of the business is 2-D design drafting. PCs have become the de facto leader there and can perform 90% of engineering tasks. It becomes harder to justify \$100,000 workstations when the low-cost systems are so capable. It's becoming difficult for high-end CAD systems to exist."

What PC CAD will not do, Fischera says, is displace mainframe applications with large database requirements.

Actually, the issue is less one of displacement than of productive co-existence. Machover makes the point that many of the conventional CAD workstations have found their place in recent years connecting with mainframes as replacements for purpose-built terminals.

PCs will take over some of those slots, he says, but what is even more significant is the likelihood that CAD networks incorporating all levels of platforms, including the mainframe, as nodes will become common.

"One scenario that has been mentioned to me frequently," Machover says, "would be for a large organization to have a network that includes one supergraphics workstation, perhaps 20 conventional CAD workstations and as many as 200 CAD-equipped PCs."

Best of both worlds

Coexistence is the kind of game plan that a company such as Signode would favor. While PC CAD has made inroads in the company, Signode's Kallinger says users are not ready to give up their larger systems just yet.

"Most of the work that we're doing can be done on a PC," he says. However, "we already have an investment in mainframes — we're not going to scrap it," he adds.

Nor is that necessary because software bridges and multienvironment programs allow PCs to both supplement and complement larger computers. In this regard, a PC can serve as a remote site or as an inexpensive way of adding seats —

Continued on page 119

IT'S THE OLD story of the kid who wants to drive a Ferrari, but his dad will only get him a Volkswagen. Engineers want the slickest machines, but their bosses want to buy smaller and get them PCs."

CHARLES FOUNDRYLLER
DARATECH

dimensional uses."

The 80386 platform, he predicts, "will give PCs the power needed to do surface and solid modeling." Functions may run slower, even on the 80386, Fournier notes, but most are feasible. All told, he says, "there are very few things that [PCs] cannot do."

There are limits, of course. "[The PC's] limitations are the limitations of

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IBM The Bigger Picture

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Mac's software, interface attract CAD users

The IBM Personal Computer has long been the machine of choice for most computer-aided design (CAD) users; however, the Apple Computer, Inc. Macintosh II is gaining in popularity.

The IBM PC CAD environment is currently richer in both hardware and software than that for the Macintosh. But the Mac is catching up because of its more intuitive user interface and the increasing availability of comparable CAD packages. Furthermore, the emergence of 24-bit color could put the Mac one promised software releases behind the market.

An IBM-compatible CAD setup is less expensive but harder to coordinate than the Macintosh or dedicated workstation alternatives, according to Jeff Madding, manager of engineering information systems for Coleman Co. in Wichita, Kan. He says the advantage of a Macintosh is in the consistent

software environment. "Macintosh has a standardized format and allows people to use a lot of different software without retraining. [But] DOS represents about 75% of our PC CAD installations," says Scott Harlin, director of marketing for Versacad Corp. in Huntington Beach, Calif., a manufacturer of CAD packages for both IBM PCs and the Mac.

"A customer can go anywhere, from general to vertical applications," he explains. "There is a horde of specialized hardware products available. The obvious advantage is the customers' ability to enter this market and find what they're looking for."

Mac gaining favor
Early shopping isn't everything, however, according to Macintosh aficionados.

Many users are already humoring "the-Mac-is-easier-to-use" tune today. Terry Woblers, a computer graphics consultant in Golden, Colo.

points out, "Smaller firms don't have resources for expensive training. The Mac is an easier implementation than either DOS or Unix. I think it will become very popular."

Bob Weddell, CAD manager for McClellan, Crus, Gaylord and Associates, an architectural firm in Irvine, Calif., says he finds the learning curve in architectural applications ranges from one day to two weeks for his Mac-based CAD users.

In January, the firm switched from its Prime Computer, Inc. mainframe running Primos, to Macintoshes, with Versacad Corp.'s Versacad as the primary CAD package. Weddell says he finds programs with "Windows" capabilities most useful. With them, he can work with the design of specific parts, such as walls or doors, then selectively blend the parts together.

Woblers, who comes from the mainframe CAD world, says that PC-based systems are quite different.

"On PC or a mainframe, a lot of memorization is required," he says. "Architects usually spend a lot of time drafting or with clients. In the PC or mainframe world, there has to be a dedicated computer operator, while a Mac user can be a total architect, easily working out drawings and client specs himself."

The 32-bit workstations are much faster than the PCs — their capabilities are higher," Weddell explains. "Right now, you'll find a lot of PCs are pushing workstation speed and performance . . . [but] the software is still lacking in the IBM PC environment.

"I consider the Mac a workstation. The Mac surpasses the PCs in performance, operation and ease of use. It's all there," Woblers says.

IBM Personal System/2s are not overwhelmingly popular for CAD. Video Graphics Array, for one thing, may not sharp enough for the 1024-by-768 pixel resolution sought

by many users.

And if IBM's proprietary Micro Channel Architecture (MCA) bus has stalled in other areas, with CAD it is practically dead in the water.

"We have some PS/2s, but at the current time none are used in CAD," Madding says. "There are few CAD cards available that support Micro Channel, so using an MCA machine limits your choices. With CAD, you often need to find the card you like first, then buy a machine with the bus that works with that system."

The CAD arena echoes dialogue familiar in other PC areas with regard to Mac-IBM competition. Madding says, "The Mac II has a lot of neat things for it — a real nice user interface. It's all there." IBM's OS/2 promises the same kind of stuff the Mac has now will be another year behind on [IBM's] Presentation Manager. If that's the interface you want, I say get a Mac now."

CHARLES BERMAN

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PC CAD

FROM PAGE 116

user stations — to the mainframe.

At Lamb Technicon, a Warren, Mich., division of Litton Industries, Inc., that designs and manufactures parts for cars and heavy machinery, Cadam, Inc.'s Cadam CAD software runs on both a central mainframe and PCs supplied to subcontractors.

Lamb, which has equipped and trained about 20 subcontractors with the PC version of Cadam, has three PCs hooked up to its IBM 3690 mainframe for the express purpose of transferring 500 drawings a week to the mainframe environment.

Cadam on the mainframe has the same interface as Cadam on the PC, says Robert Meyers, Lamb's microsystems engineer. Meyers notes that this setup allows the company to take advantage of the mainframe's ability to handle multiple files, while also monitoring the progress of the subcontractors' work through direct exchange of files.

Beyond pencil, paper

PCs are not merely encroaching on already developed territory; they are also enlarging the base of CAD users by making comput-

er-aided design and drafting accessible to many who had been making do with paper and pencil.

"CAD is an intimidating term to a lot of people," says Richard Abel, group product manager for hardware at Microsoft. "But there is a whole new class of users — a lot of people who can benefit from more powerful drawing abilities."

The inexpensive price of PC CAD has made it possible for CAD to find its way into the hands of nontraditional users; it makes a powerful tool affordable even for something as simple as facilities planning."

Facilities planning reaches the peak of complexity in LAN operations at the U.S. Senate, with people constantly changing rank and locations. There needs to be some way to connect users' computer terminals to the proper place and make adjustments without bringing the entire system — and with it the government — to its knees.

Don Spear, supervisor of the local network facility at the U.S. Senate Computer Center, used to plot all of the configuration changes manually but now finds an Evans Computing, Inc.'s Ecad-based system a boon. The work is done on a standard IBM clone with no extras.

"People move a lot and need

PC CAD makes extra demands

A PC configured for CAD will often push the hardware envelope in terms of display, resolution and storage. Some minimal types of CAD can be done with an Intel 8088 chip, 640K bytes of memory, a 512K-byte hard disk and a small monochrome monitor. But these are low-end solutions. The following are more typical configuration requirements:

- Speed. The PC's expandability gives users some flexibility, meaning any inadequate aspect of the system can be upgraded independently.

Still, most CAD users require an Intel 80386 or 80386 machine, including a corresponding math coprocessor to speed up redraw time.

- Storage. The storage requirements for CAD are ravenous. Like horizontal PC applications, there can never be too much hard disk space.

With CAD, one drawing can take up megabytes, and many CAD users recommend disks with upward of 70M bytes.

- Data transfer requirements. Users equipment for PC CAD must also pay attention to how data is to be transferred. Drawings in a corporate CAD library can be as small as 5K bytes, with a standard 1.2M-byte floppy disk or 1.4M-byte microfloppy providing adequate storage. More complicated drawings, however, can easily be triple that capacity.

A PC CAD user connected to a mainframe need not worry about the disposition of the final drawing, but the stand-alone user must often

seek a high-capacity data transfer or storage solution.

One such option is Bernoulli-style high-capacity removable disk. Removable hard disks are also available from other companies, such as Tandon Corp. and Plus Development Corp. Streamline devices can also be used for this purpose, although transfer rates are somewhat slower, and the medium is not suited for constant storage and retrieval.

- Monitors and cards. In addition, a monitor can never be too large; users often depend on high-resolution graphics cards and graphics acceleration boards — again, to reduce their redraw time.

"Even if I was trying to save dollars, the monitor is the last thing I would scrimp on," Jeff Madding of Coleman Co. says. "I would buy the biggest screen I could find. You're crazy to buy smaller than 19 inches; zooming and panning anything smaller will make you work too hard to get the job done."

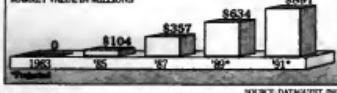
- I/O requirements. CAD also has special I/O requirements. A keyboard is not enough for this application: A mouse or digitizer tablet is needed to provide cursor control. A high-quality pen plotter is the output device of choice, while a 24-pin printer with color capabilities may be selected for draft modes. Laser printers are, in theory, ideal for CAD, but the lack of color limits their efficacy.

CHARLES BERMANT

Explosive growth

CAD software for facilities design is expected to approach the billion-dollar mark by 1991.

MARKET VALUE IN MILLIONS



to take their terminal to a different room," Spear says. "If we reproduce these plans in a CAD system, run cables in color and label them, we can pinpoint everything easily."

The CAD system allows Spear to easily differentiate a fiber-optic line from a standard one and determine the information load it can carry. When the plans are printed out in color, he

does not have to spend time shading it in with colored pencil, a step that can introduce errors.

But facilities planning is just a small fraction of PC CAD's potential in the pencil and sketch pad.

"Anybody who designs can use a CAD system to automate," says Jerry Blakely, president of Point Control, Inc., a manufacturer of computer-aided man-

factoring software.

"You can create drawings and modify them as you get closer to what you really want," he explains. "A lot of people create parts similar to a previous part, creating a new part from an old one. In addition, CAD can shorten the design cycle and decrease the design cost. Since a major source of competitive advantage is gained by the ability to bring products to market, the design cycle can be the most important element of profitability."

At GAL Manufacturing Corp., a New York firm that develops products for the elevator industry, the PC is used to design standard components for elevators. AutoCAD maintains a standard symbol library, which is modified to fit each project.

For instance, a call-button panel almost always looks the same on the inside, but cover styles and sizes can differ radically. A library of standard symbols, door openers, key switches, various shapes and standard blocks is stored on the file server for users to upload and modify.

Close to the customer
Paul Seifried, systems manager at GAL Manufacturing, says the CAD system helps keep customers apprised of revisions and brings them closer to the design process. Seifried has written a program that ties the CAD department to the sales force. The salesperson asks the customer a series of questions, and the program then creates the design automatically.

GAL's elevators may be used as part of a CAD-designed building in Chicago. City Architect Kendall J. Fleming says the Versacad system has already helped in the design of four stories.

The information for these buildings — identical except for some minor modifications — was repeated and reused in the design process. The result, Fleming says, was that ground was broken six months earlier than expected.

"It's not so important that CAD allows you to make drawings at a faster rate," he says. "It gives us an opportunity to make relevant studies of the building process. Within the same time frame, you can study more alternatives."

Fleming does most of his work on standard IBM Personal Computer ATs and compatibles; some solid modeling, such as creating newly designed elevated train stations, is done on a mainframe.

Like Seifried, Fleming has customized his CAD environment with newly acquired programming skills and created a Versacad module that manages and ties together the various levels of architectural drawing.

CAD can also be used for projects on a much larger scale. At Gulf Chemical and Metallurgical Corp. in Freeport, Texas, PC



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Versacead is used to complete structural drawings for chemical plants, the company's mid-hearth furnaces. Here, the PC calculates the thickness of the concrete wall and the location bolts, along with other details.

For Mike Boenot, a mechanical designer at Gulf, the biggest advantage of designing on a computer is the precision it allows.

engineering department earlier this year on a pilot basis.

Autocad was used to automate the creation of electro-mechanical designs for copier control panels. Tom Price, a designer in that department, says that the PC CAD system is a proven productivity booster.

"I see a 25% increase in efficiency, along with the time sav-

ing their mind-set."

"When I sat down at a drafting table to do a drawing, my mind always moved ahead to the next project," he says.

"When you do something on CAD, you have to look at it from a different viewpoint and realize that a lot of the functions will be automatic."

Acquiring in-depth familiarity with a PC CAD system is commonly estimated to take 40 to 60 hours. While that substantially undercuts the amount of training time required for many larger systems, there are some, like Microsoft's Abel, who say that a better user interface in the IBM-compatible sphere is a necessity for further market growth.

With Presentation Manager, which shipped early this month, and IBM's OS/2, PC CAD can expect a substantial boost. Presentation Manager's standard user interface will provide the IBM PC software environment with Apple Computer, Inc. Macintosh-like consistency.

OS/2's multitasking facility also challenges — indeed, large system bonus — the ability to handle multiple applications and deal with different levels and views of the same drawing.

"OS/2 will do quite a lot for PC CAD," Abel says. "Most of the people who have higher end

CAD CAN SHORTEN the design cycle . . . Since a major source of competitive advantage is gained by the ability to bring product to market, the design cycle can be the most important element of profitability."

JERRY BLAKELY
POINT CONTROL

"On a PC, you can make drawings using real-world dimensions," he says. "Designing on paper, you can get fairly close, but there is more margin for error. If you make a mistake of 1/64th of an inch for every 20 feet, the whole project will be six feet short."

Increased productivity was the objective when Xerox Corp., in Rochester, N.Y., brought Autodesk, Inc.'s PC Autocad system into its electrical packaging

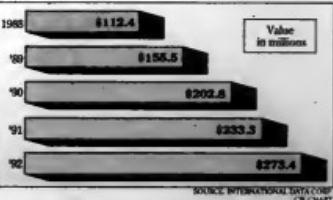
ings," Price says, adding that he expects CAD will eventually replace manual drafting for the design of all copier subassemblies.

PC CAD, Price notes, can easily coordinate the layout and design of multiple parts within a larger system, with more detailed drawings automatically created out of larger sections.

While Price says he feels that designers can almost learn PC CAD intuitively, he says that some users may need to change

Double vision

The presentation graphics software market, including the DOS and Macintosh environments, is expected to more than double in the next four years



PC CAD systems are demanding more from their PCs. They're feeling the pinch of DOS memory limitations.

"Redraw time is significant; if you have to regenerate the screen 70 or 80 times a day, it can take a while. With its ability to address more memory, OS/2 will make things move faster."

PCs are not about to take over the CAD market. They are not.

Michaelson points out, the ideal vehicle for either sophisticated production environments or some of the more ambitious directions that CAD is now taking, such as design automation,

computer-aided engineering and database management system-intensive applications.

Still, they have carved out a larger niche in the traditional CAD environment than most observers expected, and there are vast reserves of uninitiated drafters and designers still to be tapped.

"Fewer than 10% of those users who could benefit from CAD are actually using it," Michaelson says. "Most people still look at CAD as a method of making drawings faster, and this makes PC CAD a very attractive option."

CGM broadens file exchange

BY JANET CHIN

There are three letters that every organization needs to exchange graphical data across departments or systems. These letters — CGM — which stand

for computer graphics metafile, describe a standard that allows the transfer of information throughout a company or between two different companies.

A computer graphics metafile is a file of picture descriptions. It is formed by graphical primitives, such as text, ellipses and polygon sets; attribute settings

for the primitives, such as color, line width and fonts; and control instructions that determine how the pictures are to be generated and interpreted. The CGM standard includes one standard semantic encoding and three standard syntactic encodings for static picture data.

Such a standard is important because the average company has a number of departments, customers and subcontractors

using a variety of computers, operating systems and applications.

In an ideal world, documents and files that are generated in one place should be available to be integrated into documents and files located elsewhere.

And, to a certain extent, this is possible. Computers can exchange numbers and text without problem, but the options for exchanging pictures are more limited. You can take a hard copy of the picture and paste it into the next document. You can send a file of device data, assuming that the recipient has the same device. You can also send a file of the bits defining a raster picture, such as a newspaper photograph, but that takes a lot of memory and transmission time. Or you can send picture description files using the Initial Graphics Exchange Specification (IGES) and CGM.

Computer-aided design and manufacturing (CAD/CAM) applications can usually accept and generate files following the IGES standard, which transfers product definition data between applications. Extensions to this standard are available, such as the Product Description Exchange Specification (PDES), which addresses electrical engineering.

A more accurate standard
While IGES and PDES describe how an engineering object works or specify the object's requirements, these standards do not usually describe how this object should be presented on a display. It is left up to individual applications to somehow represent the object.

There are a couple of ways that this can be accomplished. Users can rely on various graphics libraries from vendors to interface them with output devices. Or an IGES interpreter can write its own graphics display routines.

Applications that use these routines will allow the user to save particular images into a computer graphics metafile for later reference. Often, however, only the application generating these metafiles or perhaps another application built on the same set of graphical routines can interpret these pictures. The end result is that an IGES description of an object may actually result in different representations on display.

With the advent of the CGM standard, applications no longer need to invent their own formats. Many more applications can generate and accept files in the CGM format. The CGM specifies a semantic interface — which describes what a user can do within the computer graphics

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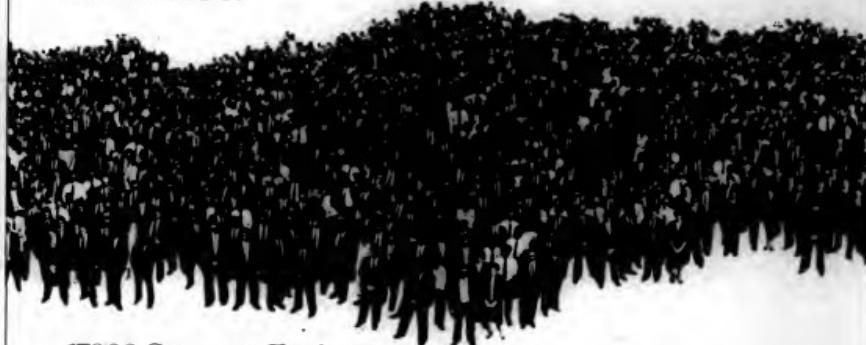
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metatile — that supports descriptions of two-dimensional graphical entities via the primitives and attributes used in displaying these entities.

Also, the CGM controls the general picture through functions that determine how numbers are presented.

In addition, the semantic specification of the CGM standard also specifies three different types of encodings:

- The binary encoding is the most compact, representing every computer graphics metatile function, such as set edge type, in some combination of binary digits. This representation of the computer graphics metatile syntax can be optimized for speed of generation and interpretation; it provides a standard means of interchange within computer systems. This encoding uses data formats similar to a computer's internal data representation.

- The clear text encoding is the least compact of the three. All function names are represented by characters that, when encountered, provide the reader with a good idea of where each command is, what it does and what its parameters are. Numbers are represented by their characters.

- The character encoding provides a syntax intended to

minimize the size of the metatile; it uses a data representation that is optimized for storage or transfer between computer systems.

Swapping descriptions

In practice, what the CGM standard means is that, just as a user can copy a picture from Apple Computer, Inc.'s MacDraw and paste it into any Apple Macintosh document, so computer graphics metatiles can be exchanged among applications that accept the same encodings.

By adhering to the CGM standard, applications can interchange graphical data. If applications can generate and/or interpret computer graphics metatiles, they can exchange picture descriptions. Imported and locally generated computer graphics metatiles can be interpreted by displaying their information on local display devices. Similar to copying a picture from MacDraw and pasting it into a document, the information in a computer graphics metatile can be read into an application. Those pictures can then be manipulated and integrated.

A number of groups support CGM. The American National Standards Institute's proposed Office Document Architecture (ODA) standard recognizes any CGM as legal semantics for its

Geometric Graphic Content Architectures and Text Presentations Metatile. This standard lets users preview their ODA documents and check layouts and graphics/text placements.

The CGM has also been integrated into the Technical and Of-

THE CGM STANDARD specification is only the first step toward supporting graphical exchange.

fice Protocol (TOP) standard. TOP is the companion protocol to the Manufacturing Automation Protocol (MAP) and is part of the protocol to exchange information within a MAP/TOP organization and among organizations and manufacturing facilities and their subcontractors and customers.

In addition, the Computer-Aided Logistics Support initiative of the U.S. Department of Defense includes a CGM Application Profile. The National Computer Graphics Association's conference NCGA '88 had a special "Integrate '88" theme that demonstrated the successful exchange of CGM files among a number of applications running on a variety of hardware configurations and operating systems.

By adhering to the CGM, companies can integrate their graphical information from these other organizations. In addition, these organizations can interpret the information generated by the CGM user.

The CGM standard specifies

technical publishing worlds.

A second addendum to the standard includes functions that support three-dimensional picture descriptions. Both addendums should be ready for public review next year.

Preliminary work is now being done on a third addendum, which would fulfill picture transfer requirements of engineering drawings and technical illustrations; art-quality graphics; and technical publishing.

Any graphical information can be transferred using a computer graphics package, whether it is CAD or not. For example, a user coordinating a major presentation with a co-worker in another location would need to see both the text and any pictures that will be integrated into the presentation. Previewing the entire project, both text and graphics, would give him a much more effective, powerful presentation in the long run.

Any company that needs to exchange picture descriptions among different applications and different environments should start looking at applications that support CGM. It can also extend current applications to support CGM by including a CGM generator program and/or installing a CGM interpreter, gaining long-term growth and flexibility. *

Charts make it easier to read doctor's meaning

Presentation graphics enhance AIDS researcher's ability to communicate complex details clearly

Presentation graphics are not always used to illustrate the bottom-line concerns of business. Dr. James Mullins, an associate professor of virology at Harvard University, uses slides generated by Cricket Software, Inc.'s Cricket Presents software on an Apple Computer, Inc. Macintosh II to highlight points in his research on acquired immune deficiency syndrome for audiences of fellow scientists.

Mullins recently spoke with *Computerworld* Assistant Editor Sharon Baker about his experience with presentation graphics and where he sees the technology heading.

How intensively do you use presentation graphics?

We do studies that enable us to learn something about the processes by which AIDS viruses attack the immune system, report the results of my investigations either as photographs of data or in tabular, graphic or summary form. I give about one seminar a week, on average,

and I use [presentation graphics] programs to create slides for my presentations.

Since I give a lot of presentations, I wanted more flexibility in the creation of those presentations than was afforded me by sending things to graphics artists.

How long ago did you make the switch to creating your own slides?

In June. Before that, we would use drawing programs and graphing programs and just print them on a laser printer and then prepare slides from that hard copy.

What do you think are the most significant recent developments that you've seen in presentation graphics?

The ability to have a slide on your screen that can be edited and updated at your leisure is convenient.

As the information you want to present changes, you can go in and update it rather than paying an artist to do the whole image over again.

What software do you use, and why did you decide to go with that?

I was using Powerpoint, but I have gone back to using Cricket Presents — which I started with — because with Powerpoint, you can only do slides on desktop film recorders and I haven't yet found the film recorder that I want to use.

Images can also be enlarged for detailed editing better in Cricket Presents than in Powerpoint. That helps in precise object movement and alignment.

What are some of the limitations that you have found?

In Cricket Presents, objects change in their relationship to one another. In other words, they may adjust back and forth a pixel or two, which for my work is a limitation. I don't know what's going to come out on the slide.

Another limitation is in plotting graphs. You're only allowed to plot five different values. You can only do 25 numbers for each category.

Cricket Presents also has problems with its prints. You don't get help on your color coordination. The color choice is limited in terms of the templates, and they're ugly templates, in my view. They just need to get an artist in there to develop some good color schemes and to get much better templates.

What's the next step that you're waiting for that might allow you to do something you can't currently do?

I'm waiting for good templates and better, more aesthetic capabilities. I'm waiting for a good, functioning desktop film recorder with [an instant snapshot] capability for quick review, because there are some glitches between the computer screen and the film recorder that you need to be able to preview. And I'd like to see template libraries grow.

But the thing I want most of all is the ability to manipulate imported images. The information I generate is not just a summary, such as "my company sold more last quarter." That's not what we're looking for. We're looking to output some complicated information. The fact that you can't manipulate the images once you've imported them and that you can't import large things is a drawback.

Do you have your own output devices?

Everything for my presentations is sent to Autographics, a slide-generating firm in Boston. They take the slide and then make a print from that slide.

You mentioned that you've been having some trouble finding a satisfactory desktop film recorder. What's the problem?

I've been trying to decide on a desktop film recorder. My evaluation to date is that they're not ready; they're not there yet. But the dealers have just gotten them. Maybe there's going to be some tricks that you can only learn by having it and using it.

What makes presentation graphics effective?

It's too new. There's only the first version of everything, except for Powerpoint, and they're all 1988 products. The next generation of products will tell how responsive the software companies have been to the suggestions that people like me have made to them.

I was reading an article recently that said some people are thinking that presentation graphics is not going to be as big a deal as was originally touted. I don't buy that. I think it's going to happen. I just wish that I could get the ear of one of these companies to do things better.

Do you feel that using graphics in your presentations has a significant impact on the effectiveness of your communications?

I've been asked whether I think it's a help or a hindrance to have these fancy slides. There are two ways of looking at it. In a way, it does distract from the point you're trying to make. Some might wonder, "Is this guy some kind of slack salesman or is he really trying to make a sober, scientific point?"

Coker, who we are just beginning to see, really enhances your ability to communicate, though, and therefore I believe that this will be the future for people who are willing to spend the time to learn it. So the challenge is for the industry to come up with shorter learning curves and better templates to facilitate the ease of the process and to expand its capabilities.

What are some of the specific benefits that you have seen because of your commitment to presentation graphics?

There's one particular slide that I have that is color-coded. Because of that slide, I can explain my main points in under a minute, as opposed to the five minutes it would take me otherwise. I gave a talk recently, and someone who's heard me speak many times before said it was the clearest presentation he's ever heard me give. I'm sure this was partly due to the fact that I have slides like that in my presentation, because I didn't really change anything else.

Does using presentation graphics packages save you time in preparation as well as delivery?

They will be a time-saver someday. Right now, they're not. They're like any other computer program in that respect. They really take a long time to learn, and there are some maddening deficiencies.

Do you see any unmet potential for presentation graphics that you haven't seen yet?

Nobody's gone beyond eight bits [in pixel depth]. Ready-Set-Show works in 24-bit color using the Raster Ops monitor and its color card, but none of the others have taken advantage of that. When I've talked to people about that, they say they're waiting for the Apple standard — 32-bit — and then they'll implement it.

The ability to use the more blended colors and the number of colors is also not quite there yet, ■

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Display list processor cards speed CAD turnaround time

BY JON PEDDIE

A common criticism of PC CAD systems is the amount of time they take to manipulate a drawing. Users waste too much time waiting for drawings to be regenerated whenever a change is made or when a different view is desired, resulting in slow response times and low productivity.

One of the methods available to help solve this response time problem is to use display list processing (DLP) cards. A graphics card with DLP can capture the database of a drawing and manipulate it independently of the host processor.

Using a separate graphics coprocessor, which is typically six to 10 times faster than the host, DLP cards can regenerate the

drawing quickly.

The basic concept of DLP involves combining groups of graphics primitives — a drawing, line or predefined shape — into a single addressable unit, or segment. These primitives are then stored as though they were only one object.

DLP advantages

There are several advantages to this method. Less memory is required to define complex images, and groups of primitives can be copied without redefining individual primitives. In addition, transform operations such as scale (zoom), rotate and translate (pan and move) can be performed on complex segments with only a few instructions.

Implementation of DLP usually includes a zoomed, birds-eye view indicating the location of the portion of the drawing being worked on. This capability al-

lows the user to see where he is in relation to the whole drawing — an important feature when the region being worked on is highly zoomed.

The following three ways to process a display list in a personal computer are available:

- Use the host processor, such as an Intel Corp. 80286 or 80386 chip.
- Use a graphics card with a programmable graphics controller, such as a Texas Instruments, Inc. 34010 processor.
- Use a separate processor card or accelerator.

Using separate DLP cards is preferable for a number of reasons.

First, because they work independently of the application program and the host, DLP cards avoid the most time-consuming portion of the drawing regeneration or redrawing — getting the data from the host's

memory or disk to the graphics controller. Furthermore, the scaling and clipping process is computationally intensive and can increase response time if handled by the host.

Finally, the speed with which drawings can be displayed increases significantly because more complex geometry can be processed with a dedicated DLP card than with just the host processor alone.

Several display controller

THE differences in DLP cards lie in their memory requirements and zooming capabilities.

Card manufacturers have implemented DLP. However, only a few CAD programs offer DLP, including Autodesk, Inc.'s AutoCAD; Microstructure Corp.'s Datacad; Skok Systems, Inc.'s Drawline 5000; Infinite Graphics' IG! 2100; Computervision Corp.'s Penta; Design Architectural and Machine; Personal CAD Systems, Inc.'s P-CAD; Robo Systems Corp.'s Robocad; and Prime Computer, Inc./Versacad's Versacad.

Autocad was the first program developed by card companies for DLP. Subsequently, a few card companies initiated DLP on their own by trapping the display list as it came off the disk and storing it in the DLP card's memory space independently of the host processor.

Autodesk became more popular, Autodesk decided to implement its own DLP method in Release 10 of Autocad. One of the features of Release 10 is its ability to provide multiple windows.

The differences in DLP cards lie in their memory requirements and zooming capabilities. Display lists can be stored on the hard disk or a random-access memory disk, in Lotus/Intel/Microsoft Expanded Memory Specification (EMS) or on the graphics processor or controller card.

The fastest and most expensive method is to store it on the graphics card. Storing the display list on the graphics controller card is a storage-card real-estate and power-supply problem.

The amount of memory a DLP card can access, however, may not be an accurate indication of the size of the drawing it can handle.

Some cards have an efficient data compression technique, letting them store a larger drawing

Continued on page 130

Princeton's UltraSync. The clear winner!



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"...the UltraSync has the edge in brightness and sharpness over the (NEC) MultiSync, making its text easier to read... the UltraSync's sharp display topped the fuzzy (IBM) 8513 display hands down... display image is as sharp as a stiletto and as bright as an arc lamp... Even as the brightness is turned up... the characters displayed on the... screen remain clear and sharp... excellent video qualities."

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PC CAD software

The companies included in this chart responded to a recent telephone survey conducted by Compuworld. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

PC GRAPHICS

COMPANY	PRODUCT	HARDWARE PLATFORM	SWIFTY REQUIREMENTS	UNIVERSALITY	RECOMMENDED FOR	TYPE OF COORDINATE INPUT ALLOWED	MENU OR COMMAND DRIVEN	FILE EXCHANGE FORMATS FOR EXPORT/IMPORT	DRIVER ASSOCIATIVE ENHANCEMENT	COORDINATE PRECISION	NUMBER OF STANDARD MACHINES SUPPORTED	NUMBER OF STANDARD MACHINES SUPPORTED	MOST FREQUENT USE OF ROTATION/PAN/TILT	SNAP CAPABILITIES	TYPES OF ARCS/ELLIPSSES CREATED	EDITING COMMANDS SELECTED	PRICE FULL CONFIGURATION
Unidat, Inc. (703) 331-0729	Card	IBM AT, PS/2 and compatibles; 20 MHz	3-D	drafter, architect, engineer, machinist	N/A	None	User defined	Txt, HP	None	15	Yes	Yes	No	Rectangular, circular	Round, elliptical, circular, 3D	\$30,000-\$35,000	
Universal Instruments Corp. (714) 868-2992	3D Graphics CARD	486DX	3-D, 3-D	Mechanical drafting	Absolute rectangular, relative rectangular, absolute polar, relative polar	Both	CGX, Giga, CAD, STEP / IGES, DXF, Dwg	None	Double-precision floating point	15	Yes	Any orientation	Grid, object, screen	Rectangular, circular	Round, elliptical, circular, 3D	\$1,000	
Vector Automation Inc. (800) 431-4247	Cellion	IBM AT and compatibles	3-D	3-D	Mechanical	Absolute rectangular, relative rectangular, absolute polar, relative polar	None	DWG, IGES, STEP, DXF, Dwg	None	8 decimal places	5	No	1/10,000 of a degree	Intersection, tangent, center, point	Rectangular, circular	Complex irregular	\$12,000-\$14,700
Verisurf Corp. (714) 966-7720	Verisurf Design 2.1	IBM PC and compatibles	3-D, 3-D	Architectural, engineering, mechanical, electrical	Absolute rectangular, relative rectangular, absolute polar, relative polar	Both	CGX, DXF, STEP, IGES, Dwg, DXF, TWIGS	None	16-decimal floating point	15	Yes	Infinite	Grid, object, screen	Rectangular, circular	Complex irregular	\$2,000	
Verisurf Mac Version 2.0	Macintosh II, SE, Plus 2.0	134-2M	3-D	Architectural, engineering, mechanical, electrical	Absolute rectangular, relative rectangular, absolute polar, relative polar	Both	PLT, AGS, DXF, STEP, IGES, Dwg, DXF, TWIGS	None	16-decimal floating point	15	Yes	Infinite	Grid, object, screen	Rectangular, circular	Complex irregular	\$1,000	
Visual Information Systems Inc. (813) 910-0204	Image Processor	Apple Macintosh II, IIx, IIcx, IIcx+, IIcx+, SE	3-D	Architectural, engineering, mechanical, electrical	Absolute rectangular	None, menu, icon, pointer	DXF, PLT, AGS, STEP, IGES, Dwg, DXF, TWIGS	None	5 decimal places	50	No	1/10 of a degree	Grid, top, polar	Rectangular, circular	Round, elliptical, circular, 3D	\$1,000	
West Coast Computers (813) 945-1200	Curve Digitizer	IBM AT, PS/2, 286SX	3-D	Architectural, engineering, mechanical, electrical	Absolute rectangular, absolute polar	Both	DXF, AGS	None	No decimal places	None	Yes	1/10,000 of a degree	None	Rectangular	Fit	\$100	

DLP

FROM PAGE 125

in RAM than conventional storage techniques permit.

Cards now offering on-board display-list memory include Cadsoft Computer Graphics, Ltd.'s Xcelerator, Imagraph Corp.'s TI-1210, Matrix Electronic Systems, Ltd.'s PC-1281, Nth Graphics Ltd.'s Nth Engine, Omnicomp, Inc.'s 1500 and 1400 and Pixelworks, Inc.'s CA1280.

EMS pros and cons

Storing the display list in EMS is a good compromise in price and performance; however, it also reduces speed. EMS access speed is a function of the bus speed of the computer (for example, 2.6 MHz bit/sec. for an IBM Personal Computer AT) and the amount of memory that can be accessed in one block (for the AT, 16K bytes).

On-board EMS memory performs slower than on-board display lists because the display list processing is typically faster. In addition, it is easier to access the memory and can be organized to take data continuously or in large chunks rather than stopping at DOS's 16K byte limitation. The data can also move at the maximum speed possible, it is not limited by the bus speed of the PC.

Cards in this group include Control Systems, Inc.'s Artist 10GT, Kontron Electronics' 7000CB, Number Nine Computer Corp.'s Pepperpro1280, Ver-

ticon, Inc.'s H-254 and Vermont Microsystems, Inc.'s Cobra.

Most of the cards have a memory usage indication, either on-screen or available through a command.

This shows users when the drawing is getting too big for the display list memory. This indicator shows how efficiently a card manages its display list memory.

Display list capability does not necessarily lead to superfast zooms and pans. Some cards will be very fast, offering a tenfold increase in speed, while others will offer only a threefold increase. The difference relates to the strategy used in storing the display list, the type of DLP card, the location of the display list and how tightly coupled it is to the bus speed.

Some cards have fixed zooming steps (for example, one time, two times, four times and so on) and have few continuous or dynamic zooming.

Dynamic zooming allows you to just scroll through a drawing; it is like sliding a large paper drawing around on your desk. When you get to a point where the drawing has a lot of fine detail, that you need to verify or add to, you can zoom way down and easily see as much detail as needed.

DLP offers a method of improving throughput without a faster computer. Through the use of EMS and Autodesk's enhancements, more card companies will offer DLP, giving CAD users a variety of avenues to improve productivity.

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.



Pixelworks is currently offering a 1,280 by 1,024 pixel board.

Does Pixelworks have any plans to release a lower priced 1,024 by 768 pixel board? If so, will that board be able to run on an 8-bit bus?

*Robert S. Schaefer
Chief Engineer
Owens-Corning Fiberglass
Toledo, Ohio*

PIXELWORKS, INC.: In its current family of graphics controllers, Pixelworks offers the Pixelworks Micro Clipper with 1,024 by 816 pixel resolution, 16 colors, with a 50 KHz scan rate and an 8-bit price of \$2,795.

The Micro Clipper does not run on an 8-bit bus because that would make it dramatically slow. Therefore, this type of computer-based graphics application should be run on an IBM Personal Computer AT machine or compatible based on an Intel Corp. 80386 chip.

What kind of impact will the impending arrival of Autodesk, Inc.'s AutoCAD Release 10 have on the Kinetic Cadconvert package from Kinetic, keeping in mind Au-

todesk's full three-dimensional capabilities?

*Brian Berrie
CAD Systems Specialist
Miller, Zell, Inc.
Atlanta*

KINETIC PRESENTATIONS, INC.: Kinetic Cadconvert does not currently address the new AutoCAD Release 10. Our upgrade edition will be compatible with Release 10, however, and users will be able to select the three-dimensional perspective after importing an image into Kinetic Cadconvert. We will be releasing this version until late 1989.

I am currently using Control's product Modelmate for solid modeling. However, I am also using Truevision's, Inc. Tip Imaging Software for producing wireframe models.

When and how can I bring Tip images into Modelmate to construct wire frame models without destroying the Tip image?

*John Chaffee
Owner
Chaffee Design Works
Winston-Salem, N.C.*

CONTROL AUTOMATION, INC.: Modelmate only accepts Hailo PIC images and, therefore,

will not accept the Tip images. However, according to the manufacturer, Tip has a capture utility that can be used to get Modelmate images into Tip.

Although two full screens cannot be merged into one, by using the Paint Down command the user can merge pairs of images and a full-screen image, thereby allowing Modelmate models and Tip images to be merged.

I am using Intex's 3-D Graphics as an analysis tool to test the detection sensitivity of airport metal detectors. Because 3-D Graphics is a 3-D package, there are no grids to use for reference. However, if I could set the color bars within the package at a specific size, then they could give me a point of reference. How can I modify the 3-D Graphics program to do that?

*James Jaquet
Vice-President of Engineering
Infinities
Wilmington, Del.*

INTEX SOLUTIONS, INC.: 3-D Graphics is a Lotus Development Corp. 1-2-3 and Symphony add-in program and can therefore be further enhanced by a variety of compatible Lotus programs, such as Lotus Freelance.

Freelance is capable of importing graphs created in the Lotus PIC format. Once inside Freelance, titles and legends can be moved or resized, icons added and the color bar size set. *



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IN DEPTH

Scoping out the PC options in 1989

What to seek and avoid in LANs, hardware, applications, the Macintosh and PC management

Will 1989 be the year of the LAN at last?

Will pictures preempt prompts for PC prominence?

Is the Mac destined to be tops on laps?

And how 'bout that Micro Channel?

Indeed, 1989 is the year everyone in the personal computer field has been waiting for. New high-powered PC hardware is in place, there are operating systems to support it, applications to make it worthwhile are reportedly on their way and everything is coming up networks.

But nothing comes easy. MIS organizations may be in trouble if they choose 1989 to invest heavily in DOS, standardizing on Microsoft Corp. Windows, let users set their own connectivity standards or bide their time waiting for Apple Computer, Inc. and Digital Equipment Corp. to hammer things out.

And that doesn't even take into account the uncertain economic picture, the saw-toothed price pattern on memory chips, standards wars in buses and Unix and the rumble of crumbling software ship dates.

In short, it will be easy for the unwary MIS exec to make mistakes next year.

To lend a hand, *Computerworld* asked the experts — our staff of PC reporters — to train their journalistic telescopes on the technologies and trends that will make their marks in 1989 as well as those MIS should avoid.



In the following profiles, we look at the prospects in personal computer hardware and software, networking, microcomputer management and local-area networking. We also contacted a group of MIS managers to ask if we could sneak a peek at the crystal balls on their desks.

A few things are clear. MIS execs are sick and tired of unfulfilled promises, unmet ship dates and deflated forecasts. They are scrambling to get more control over existing LANs and LANs to be. They do not want performance unless it comes with compatibility, and the big thing on their minds is connect, connect, connect.

For the skinny on what's hot and what's iffy, read on.

- **Keep an eye out for the Macintosh laptop**
- **DOS software upgrades due from all vendors**
- **3270 cards going the way of the dinosaur**

All eyes on graphics in applications arena



BY STEPHEN JONES

SPRING '89

In the world of personal computer applications, 1989 could well be "The Year of the Spreadsheet."

As workstation-based IBM and compatible PCs make the transition to the graphical user interface of IBM's OS/2 with Presentation Manager, prototypes and prototypes will abound. The number of stable graphics-based applications, however, will be small.

This week's Comdex/Fall '88 conference in Las Vegas could provide users with a peek into the graphics world of tomorrow.

The problem: Tomorrow's innovative products might not arrive until well into 1989.

"I haven't seen the so-called

'insanely great' applications that would cause you to pay the \$5,000 for an upgrade to OS/2 next year," says Jeffrey Tarter, editor of the "Softletter" newsletter in Cambridge, Mass.

In fact, the only Presentation Manager program expected from the PC software industry's Big Three developers is Microsoft Corp.'s Excel spreadsheet.

Delays on the Microsoft MS-DOS upgrade for Lotus Development Corp.'s 1-2-3 are pushing back a release date for 1-2-3/G, the Presentation Manager version of the firm's flag-ship product.

At lotus Corp., which had its own delays with its Phase IV DOS upgrade, is expected to have an OS/2-based version of the database management program in 1989. However, observers say it will not support Presentation Manager.

Neither Lotus nor Ashton-Tate have given release dates for their graphics-based versions of the products, but industry analysts say they do not expect to see any of these offerings before 1990.

Still, the applications terrain will not be entirely desolate in the coming year. Smaller soft-

ware vendors should, in fact, offer an entry in each major application category toward the end of 1988, including word processing, database management and spreadsheet programs.

Look to Windows

And users who are not satisfied with the early Presentation Manager graphics offerings and are put off by hardware upgrades may turn to the cheaper Microsoft Windows-based environments, which offer multitasking and a graphical user interface.

"Windows could be the answer for people who are looking for interim applications while waiting for OS/2," says Bill Higgs, director of software research at Infocom, a Cupertino, Calif.-based market research firm.

Presentation graphics pro-

mises to be an area of high growth in the Windows-based market. Adobe Systems, Inc., for example, is rammed into the presentation graphics fray in 1989 with a product called Persuasion.

But all the interest over Presentation Manager applications will not completely steal the limelight from the DOS world.

In addition to major DOS upgrades from companies such as Microsoft, Ashton-Tate, Lotus and WordPerfect Corp., new software is scheduled to hit the street to help users develop business forms.

Designed to take advantage of the high-quality graphics of laser printers, forms processors combine the horizontal and vertical capabilities of complex layouts and heavy data management. Xerox Corp. is expected to announce at Comdex that it will

APPLICATION TRENDS

What to watch for . . .

- Smaller vendors' entries in each major application category.
- Presentation graphics in Windows-based market.
- DOS software upgrades from all major vendors.

What to avoid . . .

- "Hot" products that are far from reality.
- CD-ROM — few viable applications are expected.
- Looking for early graphics-based OS/2 Presentation Manager applications.

market such a product.

Tarter says that DOS-based spreadsheet, publishing and project management programs will receive new life in '89 with upgrades and utilities aimed at helping users get more out of their advanced laser printers.

Downs expected

And what about big disappointments for 1989? Early graphics-based applications in general will have trouble delivering the sensation needed to win the hearts of most users. According to Higgs, "Presentation Manager applications are really a 1990 phenomenon."

The lack of innovative applications promises to prolong the troubles of compact disk/read-only memory technology as well. In addition, advanced network-based versions of software products will also face slow growth as many of these applications crawl to market.

Otherwise, it appears that 1989 will be a year of positioning for many software vendors that are eager to stake a claim in future markets by giving users an early glimpse of what they can expect.

According to a more draconian view from Tarter, 1989 could also be "The Year of the Let-down" for PC applications.

"Everything that appears to be hot will be a disappointment," Tarter says. "Nothing ever lives up to the expectations of the vendors and the press." *

User sophistication, support costs to soar

BY MICHAEL ALEXANDER

CW STAFF

Two of the most significant events affecting information services managers next year will be the continued stockpiling of personal computers and the rise in end-user computing in corporations.

Already, the penetration level of personal computers is nearing 1½ machines per office worker, according to Jan Duffy, partner of information technology practice at Peat, Marwick, Matt & Co. in Toronto.

"This critical mass of PCs, coupled with an increasingly sophisticated end-user community eager to adopt PC technology," will be one of the dominant issues that MIS managers will face, she says.

End-user computing evolves in phases — from users developing their own programs to developing applications — and the point at which an organization is in its evolutionary cycle will determine what specific issues MIS managers will deal

with in 1989 and beyond, according to Duffy.

Information systems where their users are in the cycle, MIS managers will find that the true costs of end-user computing will rise in 1989.

These days, a "naked PC" actually costs \$18,000 in the first year, after hardware, software, installation, maintenance and other related costs have been factored in, according to Duffy.

Support surprises

"Hardware and software acquisition is less than 30% of the total direct investment in microcomputers," Duffy says. "More than 50% of the direct costs are consumed by support activities in the business unit and beyond it."

Consequently, end-user computing will account for a higher percentage of the corporate information budget, perhaps as much as 39% in 1989, up from 30% in 1986, she adds.

The spiraling cost of PC acquisitions will be accompanied by a rising concern in the offices of

top management of whether those PCs are adequately contributing to the efficiency and effectiveness of the firm's workers.

MIS managers and end users will likely be faced with justifying technology acquisitions next year. MIS will also find that it will be devoting more time to selling the benefits of end-user computing to upper management and educating them to the fact that the payoff for PCs may not be readily apparent for several months.

While 1989 will not be the year of the local-area network, MIS has found that in the last eight years have been a look for more PCs to be linked in networks.

The change from single-user PCs to computers supporting cooperative work groups will be

particularly evident next year and will have a long-term impact on information services.

In addition, with PCs rivalling mainframes in power, computer technology will be increasingly dispersed on desktop tops throughout the corporation's entire setting, diluting the influence of the information services center in the process, according to some analysts.

The central computing facility will begin assuming a leadership role in guiding end users to higher levels of PC connectivity. The information system will become the platform on which the corporation's connectivity strategy will sit, according to one MIS manager.

Other places to save

The MIS department will also find itself spending more time reducing naive and redundant purchases of computer technology by end users, as well as developing new strategic applications of computer technology for the corporation.

The role of end-user computing will have an impact on the role of MIS in a variety of other ways.

For example, information services will not drive spending

levels for technology as they have in the past, nor will they continue to develop or support small applications.

However, they will be more likely to develop the corporation's overall technology strategy and architecture and to coordinate systems planning across several units, industry consultants point out.

In 1989, MIS and end users will enter into tentative partnerships, rather than continuing the adversarial relationship that exists in many organizations. One reason for this alliance is that central-system staffers will find it easier to teach end users about using the technology than teaching technical experts about every aspect of the company's business. *

MANAGEMENT

What to watch for . . .

- PC proliferation.
- PC connectivity.
- Even more end-user computing.

What to avoid . . .

- Adversarial relationships with end users.
- Developing and supporting small applications.
- Technology acquisitions without justification.

Integration is LAN watchword

BY PATRICIA KEEFE
CW STAFF

Next year may well be the annum of what wasn't in personal computer local-area networks.

OS/2 connectivity, very high-speed networks and network-transparent applications — whether LU6.2-based or distributed — are all very much in the headlines today. Along with SQL servers and Open Systems Interconnect support, most of these hot buttons will wind up on massive user requests for proposals, but don't expect widespread deployment.

These technologies are just beginning to emerge from the shroud of vaporware, and much of the supporting pieces have yet to ship. Consequently, you will not find them in very many user shops in 1989.

Most users will settle instead for more low-key and less glamorous, but nevertheless useful, additions to their LANs.

Possibly the most important LAN trend that the industry will see in 1989 revolves around enterprise-wide connectivity. "Users will be aggressively hooking LANs together," agrees Harry Saal, president of Network Gen-

eral Corp., a maker of LAN testing products in Mountain View, Calif. He suggests it has become passe to merely link PCs together. "The phase now is major corporate interconnection, which will result in explosive growth in gateways and routers," he says.

In many ways, MIS will be

networks. The goal is to welcome departmental LANs into the corporate information fold.

This effort is important because merging isolated LANs into an enterprise-wide system should provide users with increased access to host resources and allow MIS to better plan ser-

vices, support and upgrade schedules. "By the end of 1989, the LAN will have become more of an architected transport solution," predicts Bill Redmond, an analyst at the Gartner Group, Inc. in Stamford, Conn.

Maryann Chernoff, an analyst with Eason & Whisman's Network Strategies Inc. consulting group in Fairfax, Va., sees an accelerated move away from stand-alone IBM 3270 emulations toward host access via network gateways. As more and more corporations hook desktop machines to the mainframe in one network, it will become difficult to cost-justify 3270 adapters.

Another driving force behind the probable LAN integration movement in 1989 is network management. It is a lot easier and cheaper to monitor network activity, problems and abuse on one large interconnected network than it is to track and in-

Continued on page 136



taking steps to regain control of the legion of mixed networks proliferating throughout their departments. This effort will result in more restrictive LAN purchase policies, as well as tighter control over how host systems are accessed and by whom.

Addressing these concerns,

the activity most likely to top user priority lists in 1989 is a continuation of efforts to integrate islands of LANs — either to each other or to wide-area

Apple gets started early with Mac IIx

BY JULIE PITTA
CW STAFF

While John Sculley, Apple Computer, Inc.'s chairman and chief executive officer, has been fond of calling 1988 "the year of networking" for Apple, 1989 promises to be "the year of the CPU" for the company as it broadens its line of Macintosh computers.

The flurry of new systems announcements expected for next year got off to an early start last month when Apple introduced a Motorola, Inc. 68030-based Macintosh II — the Macintosh IX. The debut of a new Mac contradicted a number of public statements made by Sculley that Apple would introduce no new CPU in 1988.

Apple's decision to debut the Mac IIx months earlier than originally scheduled may have resulted from its desire to beat Next, Inc. — and Apple co-founder Steve Jobs — to the punch with a 68030 machine and avoid any unfavorable comparisons with the late-dane Next workstation.

So now what does 1989 hold for Apple? Apple research and development teams reportedly have a number of products ready for introduction. The much-anticipated Mac laptop is among those likely to be released in 1989.

"They definitely need to come down in their line with entry-level Macintosh systems," says Tom Young, PC industry analyst at Computer Intelligence in La Jolla, Calif.

Apple is ready to take advantage of the burgeoning laptop market. According to corporate customers close to Apple, the Mac laptop will offer state-of-the-art screen technology and a number of high-performance features.

It is also expected to carry a hefty price tag: the Mac laptop

will be a machine for serious business users, not hobbyists.

The leaks to the press about the Mac laptop have piqued the interest of Apple's corporate customers. For example, Jeff Ehrlich, MIS chief at General Electric Co. in Milwaukee, says he is willing to pay a premium price to get the Mac's user-friendly interface in a laptop machine.

Bridge ahead

Other systems expected to debut from Apple in 1989 include a desktop version of the 68030 and "bridge" configurations of the Motorola 68000-based Macintosh SE and the Motorola 68020-based Macintosh II.

Apple will probably use the Mac II as a base for a line of more sophisticated systems, while the Mac SE will be the flagship for its low-end line. Young predicts:

Perhaps most important among those "bridge" Macs is a



SQL continues push to the desk top

BY DOUGLAS BARNEY
CW STAFF

Nearly every personal computer technology that will have an impact next year has already been talked to death. And those that have been hyped but will fail to deliver have more literally been talked to death.

Development Corp. and others have been yakking about personal information managers, which handle random bits of information. These PC software products will show up on some desks, but they are not expected to set the world on fire,

in fact, because users have yet to figure out what these products really do. The software will fail to live up to the hype that surrounded the emergence of this category. "Most people are having a hard time giving them away," says Jerry Schneider, president of Schneider Computer Systems, Inc., a Burke, Va., consulting firm specializing in in-house issues.

Users may eventually want these personal information manager products, which organize the mountains of papers that clutter their desks; it just won't be in 1989.

IBM's SQL, originally a mainframe data access language, will continue to creep onto the desks of end users next year. This trend will be spearheaded in part by Adelton Technologies Corp., which already offers a version of DBase IV that contains SQL. But the bulk of DBase users will only dabble in SQL; most will use the product's more conventional features.

SQL will, however, be

used more heavily on another class of PC product. Database management systems software packages with large systems heritage are entering the micro market, allowing large systems applications to be offloaded to PCs. Here, SQL is a key ingredient, and analysts expect firms such as Oracle Corp., Relational Technology, Inc., Informix Software, Inc., IBM and Sybase, Inc., to pave the way.

Sneaky Mac software

In other sectors, even though IBM and Microsoft Corp. have now finished their graphical, large-memory PC software platforms, the Apple Computer, Inc. Macintosh will continue to lead the race for the most exciting software. The Mac can now boast of animation, presentation software and musical programs that are becoming more human all the time.

Meanwhile, applications for IBM and Microsoft's Presentation Manager are just being written. They will not stop at license numbers until late in 1989, users, analysts and even vendors agree. IBM and Microsoft Corp.'s OS/2, however, will have

Continued on page 137

low-cost version of the Mac SE. The Mac has never been held back, but a recent price increase — blamed by Apple officials on the rising cost of memory components — has created a gulf between the Mac and its Microsoft Corp. MS-DOS counterparts.

"You can buy two classes for the price of one Mac SE," says Bill Lemmons, personal computer industry analyst at Dataquest, Inc., a San Jose, Calif., market research firm.

What Apple may have lost and what it will work hard to regain is its reputation for being an industry leader in user-interface technology. In introducing his own workstation, Steve Jobs has taken a swipe at Apple, calling Mac the "technology of the 1980s." Apple will likely counter Jobs' charge with enhancements to

Continued on page 136

MACINTOSH TRENDS

What to watch for . . .

- Advent of the laptop Macintosh.
- Arrival of a desktop version of the Mac.
- New configurations of current Macs.

What to avoid . . .

- Waiting for a quick resolution of the Apple vs. Microsoft/Hewlett-Packard case.
- Promises of new products from the Apple/DEC liaison.
- Visions of DEC sales reps toting Macs on calls — it won't happen.

Integration

FROM PAGE 135

some cases, locate a dozen scattered LANs.

"Once you start inter-networking, people start to put more mission-critical applications on LANs, and that's when management facilities become much more important," says

Mike Howard, an analyst with Infonetics, Inc., market researchers in Santa Clara, Calif.

This integrated web of networks could contribute to easing network diagnosis and management problems, especially if one package were available to handle all networking activity.

But because none of today's packages account for the mix of communications technologies

many companies employ, users will opt for the next best thing—beefing up or adding administration, security, and management capabilities to their LANs.

"This kind of integration lost on the major LAN vendors. IBM, 3Com Corp., Novell, Inc., and Banyan Systems, Inc., for example, have significantly enhanced their network software this year," says Howard. "Continued on page 137

LAN TRENDS

What to watch for . . .

- Linking LANs to mainframe and mini resources.
- IBM-to-Mac connectivity.
- Growth in multiuser, network-specific applications.

What to avoid . . .

- Islands of LANs.
- Haphazard LAN purchases.
- Stand-alone 3270 emulation.

Apple

FROM PAGE 135

the Mac operating system, which is also facing rough competition from IBM and Microsoft Corp.'s Presentation Manager interface.

Next in line

"The Next system makes a statement about where computing is going in the next five years," Lempesis says. "I don't think it's a direct threat to Apple, but the interface will help expand the Macintosh. Both the Presentation Manager and Next present challenges to Apple."

So stiff a challenge, in fact, that Apple has brought charges against Microsoft, and the "look-and-feel" lawsuit is expected to drag on through most of next year unless the parties can reach an out-of-court settlement.

Although Apple is not expected to continue the volume of connectivity announcements in 1989, it will continue to offer more Apple-brand connectivity products through its newly acquired subsidiaries such as Orion Systems, Inc. and Network Solutions Corp.

But there are still gaps in Apple's connectivity offerings. Yet to be placed in Apple's lineup is a token-ring card, a product expected to be introduced before the end of this year, according to company officials.

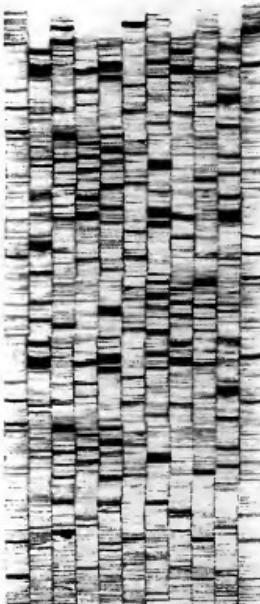
Connectivity coming

Computer Intelligence's Young says Apple will continue to bolster its connectivity offerings through a "combination" of third-party products and its own Apple-brand products: "They haven't accomplished all they need to in networking — people are looking for more networking solutions."

Finally, don't look for Apple's alliance with Digital Equipment Corp. to result in products. Most industry analysts say they feel that the fruit of the partnership will be guidelines for third-party developers and that it is more symbolic in nature.

The dream among some Apple boosters that Digital Equipment Corp. and its representatives would push Macs with DEC's VAX systems to have evaporated. In fact, DEC is making another stab at getting its own desktop business. *

Theirs.



The second most reliable impact printer did this much before it stopped. It wound up in the repair shop after 7,000 hours or ten months of printing.

Integration

FROM PAGE 136

with a blend of these types of capabilities.

Hand-in-hand with these enhancements will be a growing tendency to take the role of network administrator much more seriously, according to Mark Freund, a network consultant at

Pasadena, Calif.-based Interconnect Group.

By taking a more formal approach to network administration in 1989, users will be able to take advantage, if necessary, of the good client, peripheral and file sharing into electronic mail, databases, services and integration of Apple Computer, Inc. Macintoshes and OS/2-based workstations into the MS-DOS LAN. *

PC TRENDS

What to watch for . . .

- SQL's continued entrance into PC software products.
- Unix to be hot on micros.
- Hypertext products grabbing more enthusiastic users.

What to avoid . . .

- Personal information manager software — not in 1989.
- OS/2 — it won't manage to excite the average end user.
- Groupware hype; expect little actual use.

SQL push

FROM PAGE 135

an impact on two groups next year. One is professional programmers, who can be more productive working in a large-memory environment. Another is users that have one primary application.

By next year, both Ashton-Tate's Dbase and Lotus' 1-2-3 Release 3.0 should be running under OS/2, and the two products will offer an incentive for power users to upgrade.

OS/2 itself, however, will mainly fall in its quest to attract the average end user. The system is too expensive, and there are too few applications to convince large numbers of people to adopt it.

Unix, at least based on the situation it is currently getting, is sure to be hot on microcomputers next year. Already, Unix-based multitaskers are replacing the need for small

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IT WON'T be 'The Year of Anything' — God willing."

JOHN McCARTHY
FORRESTER RESEARCH

minicomputers at many sites. However, the big challenge will be for the desk top.

Hypertext will have a large impact in 1989 for two simple reasons: Apple is basically giving its Hypercard away with every new Macintosh, but more important, nearly everyone that tries Hypercard is captivated. This type of user enthusiasm clearly indicates that success is on the way.

Groupware holdup

Groupware will continue to be hyped ad nauseum, but few user sites will adopt this style of software. Key users in 1989 will probably be the vendors themselves.

In personal computer hardware, exciting breakthroughs do not always mean commercial success. Despite the glitz and sex appeal of the workstation from Steve Jobs' Next, Inc., most users will simply buy faster machines.

Larger disk drives and 25-MHz or faster Intel Corp. 80386 chips will soothe speed-conscious connoisseurs, while faster Macintosh machines will help Apple lovers run more and more sophisticated applications.

The bottom line for what 1989 will provide in microcomputer hardware and software is summed up by John McCarthy, an analyst at Forrester Research in Cambridge, Mass. "It won't be 'The Year of Anything' — God willing," he says. *

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Plus 

PC managers wary of new year

BY WILLIAM BRANDEL,
STORY

For most MIS directors, 1988 will not be missed. The past year has given them one word to take with them into 1989: Caution.

In an effort to gain market share — or in some cases, domi-

nate it — personal computer vendors have done more to damage their relationships with PC managers in 1988 than any competitor ever could. Vendors have ignored information systems' continuum and compatibility, gaining a credibility problem in the process.

In 1988, MIS has become judged from a bus standards conflict that left both camps equally dubious. MIS learned that software products are not announced in advance to help them but instead to lock them into a product strategy. Compound this situation with repeated bro-

ken promises of integral product shipments, and you've got a wary group of PC managers.

"Although our corporate office feels very strongly about [new] technology, I'm telling our people to be very cautious," says Dennis Murphy, director of MIS at GTE Corp. in Stamford, Conn. "We are not adopting anything [controversial, from] P5/2s to Unix. I'm just pushing to find out more about it."

For those MIS managers interviewed, there is still only one PC standard for 1989: Microsoft Corp.'s MS-DOS. And even the gangly Unix is getting sidelong glances. Most are disappointed with the OS/2 issue thus far, and all have grave concerns over the visibility of PS/2s.

"Nobody knows what to do next, especially with this OS/2 and PS/2 business," says Don Whittington, MIS manager for Michigan Sugar Co. in Saginaw, Mich. "MIS is in a holding pattern."

"I can see a future for the PS/2," says Joseph Vincent, director of technical planning for medical supplier Humans, Inc., based in Louisville, Ky. But he adds, "We're betting that IBM is not lying to us when they tell us [Micro Channel Architecture] is for real."

Summarizing MIS angst over the unsynchronised paces of PC hardware and software technology, Whittington hints that finding the elusive PC "growth path" is MIS' first priority.

"There is just too much hard-

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Cooperative processing

Distributing functionality to workstations is nice in theory, but it may be out of reach for now

BY DAVID BAER

A year and a half ago, a dialogue erupted in MIS that, like sunspots, briefly disturbed intelligent communication. The subject of this interchange was the imminent death of the mainframe at the hands of personal computer workstations.

Fortunately, few took the talk seriously and the silliness soon

Bier is technical director of the mainframe products group at Temera Management Services, a manufacturing systems consulting firm in Berkeley, Calif.

died out. It did, however, illuminate an important direction in data processing: the evolution of the mainframe into a centralized, enterprise-wide file server networked to intelligent workstations.

This distribution of transaction-oriented functionality between mainframes and workstations is commonly known as "cooperative processing." The term specifically refers to transaction processing application structures; it does not encompass such activities as mainframe data extraction for spreadsheet manipulation.

Although it is not yet a completely viable alternative for

MIS, in many ways the concept of cooperative processing has considerable merit. Personal computers are currently considered to have a bigger bang-to-buck ratio than mainframes. It must therefore be appealing for MIS to recast a traditional set of mainframe-based transaction processes in a new mold, in which intelligent workstations not only replace the dumb terminal's display functions but also shoulder some of the computational responsibilities.

The technology seems to be emerging to allow such an approach, at least within the IBM milieu. We now have a common communications protocol in

LU6.2, which is available in IBM's OS/2 Extended Edition for PCs, as well as a mature LU6.2 implementation on the mainframe provided in CICS.

Furthermore, it appears that a single database management system standard for mainframes has arrived in the form of IBM's DB2. This product inspires confidence that our application investments today will be providing paybacks for many years.

Unfortunately, however, a decision to implement a major application using cooperative processing may not be prudent at this time.

Certainly, the current cost of PC processing cycles can be shown to be more economical than that of mainframes, but that is only part of a complex equation. There are a number of subtle factors that must be examined, including cost, allocation of resources and performance measurement.

We will disregard the subject of the true cost of an adequately configured workstation; it has received sufficient attention elsewhere. The primary justification for such a purchase will usually be its utilization in traditional PC application pursuits.

Mixed environments

It is unlikely that a major application can be targeted for a network consisting only of workstation nodes and no dumb terminals, so the first obstacle in implementing a cooperative solution is catering to a network mix of workstations and dumb terminals. This problem is not insurmountable. The chart on page 142 shows how one application program can provide data access service for both terminals and workstations. Clearly, a good deal more code is required to support dual configurations, which will add to the initial programming costs and may prove to be a serious maintenance burden as well.

However, even a well-heeled



RON BELL

- Expect higher maintenance costs
- Little comparative performance data
- Learn to work with LU6.2

MIS organization with the latest technology in its network has further obstacles to face.

The next problem is the mixture of languages required. On the one hand, the processing services will likely be provided by CICS Cobol programs. The current IBM Personal Computer language of choice is C.

MIS must expect additional programming costs for debugging the interface between the cooperative processing partners. That problem will be amplified by a mix of languages. How many programmers do you have who can code effectively in both languages and environments? And what do you do if he quits?

These environmental issues can be reduced to one consideration: If you wish to budget for the increased development and maintenance costs, you may be able to overcome the problems, but a fairly serious concern remains. Consider the following hypothetical transaction.

A screen of purchase order

THE KEY TO a relevant measurement is determining processor utilization of functional components — that is, blocks of code — within transaction programs.

data is displayed, into which a buyer inputs information regarding the receipt of some ordered material. In processing the incoming data, the transaction must perform the following operations:

- Validate any entered command.
- Validate incoming data for correct syntax — that is, dates are of correct format, content and so on.
- Perform relational validation of entered data — that is, quantity received is not greater than quantity ordered and the like.
- Validate codes — unit of receipt, material condition and so on.
- Update a line item in the purchase order database.
- Create a receipt record.
- Update quantities in the inventory database.
- Return a completion status to the user.

This is a robust — but nevertheless realistic — transaction, just the sort of heavy hitter for which MIS would like to reduce mainframe utilization.

The problem, of course, is that only the first three and the last of the above functional elements are candidates for workstation processing. The fourth operation, code validation, might also be achieved at the workstation if the correct codes are not too heavily volatile and a workable distribution strategy can be designated. But the remaining functions must be mainframe resident, because that is where the data is located.

Furthermore, if you analyze the functional elements in terms of instruction path lengths, it is questionable how much you have truly saved in terms of mainframe processing.

DBMS activities will likely consume a significant portion of the total processor cycles required by a transaction of this nature.

And the teleprocessing monitor dispatching process necessitated by task waits on DBMS request completions may also be important. Task management activities can account for 25% of a CICS region's total CPU consumption. By contrast, routine edit processing is usually both rapid and straight line, involving no teleprocessing monitor dispatching processing.

The irony is that an analysis of the code of a mainframe program that incorporated all the functional elements of this transaction would probably show that one-half or more of the statements could potentially be shifted

ed to the workstation. However, doing this would not necessarily reduce the mainframe processing requirement by one-half.

When it becomes available, formal resource measurement data in this area will surely be useful in dealing with the cooper-

ative question, but we cannot expect to see comprehensive performance information on this nascent technology any time soon.

It is difficult enough today to find credible benchmark measures for mature technologies. For the time being, then, intuition and common sense must remain the basis for design decisions.

Because every application is unique, the correct design choices for one application are not necessarily applicable to others.

For example, the table on page 143 lists the commonly found steps in a business transaction, identifying those that MIS may be able to offload to a workstation. By assigning relative frequencies to each of the items and weighing each by anticipated mainframe resource consumption, we can derive at least a crude estimate of the benefits of a cooperative solution.

But a more precise evaluation may be possible. At first glance, measuring resource consumption data for a cooperative environment would seem to be an elusive challenge. There is an "apples and oranges" quality to

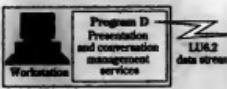
Partitioning of functions in a mixed environment

In structuring code for servicing a mixed population of workstations and terminals, certain processes can be utilized to service both configurations; in the environment represented below, Program A provides common function.

Conventional transaction configuration



Cooperative processing configuration



SOURCE: TERENA MANAGEMENT SERVICES CW CHART

at least the scope of the problem is easily definable.

The simple purchase order transaction has a property that simplifies a cooperative processing design: There is a single block of mainframe function that is easily segregable.

The design becomes more complex if there are significant blocks of computational function interleaving the mainframe function access. In this case, a more difficult analysis is required regarding the trade-offs between the benefits of offloading that processing to the workstation and the penalties of multiple bidirectional transmission between the partners.

On the one hand, the LU6.2 verb set renders the coding of

TEN YEARS AGO, WE GAVE



such interchanges a relatively straightforward task.

But there will be a performance degradation proportional to the number of request/reply transmissions. Clearly, this degradation will be more evident where the workstations are remotely connected. However, even for local workstations — connected, say, via an efficient local-area network — there will be overhead associated with the queuing of transmission and task management requests by network and teleprocessing monitoring and dispatching components.

Not only that...

Two asides are appropriate here. First, a fully functional distributed DBMS capability, if available, would be no panacea. In fact, it would introduce a worse scenario in which every individual database access requires a pair of transmissions.

Second, pseudo-conversational coding techniques promote efficient resource utilization in transaction processing applications. The LU6.2 verb set is blatantly conversational in nature, but it does not alleviate the need for a pseudo-conversational approach. Long-running LU6.2 conversations will be no more acceptable than long-running conversational tasks.

Indeed, pseudo-conversational programming is particularly essential in a CICS/DB2 environment. Using LU6.2, conversation allocation/deallocation simply replaces terminal task initiation/termination.

In short, cooperative processing is not a bad idea; it is just

a good idea whose time has not yet come.

No doubt MIS needs some application solutions today whose requirements justify the added expense and difficulties of implementing a cooperative setup,

particularly in cases in which high-resolution graphics must be well integrated with central DBMS information.

But for the conventional business application, a careful cost/benefit analysis is appropriate

before proceeding with such an approach.

The difficulties of implementing cooperative processing will eventually recede, however slowly. The facilities of IBM's Systems Application Architec-

ture (SAA) will likely provide the primary contribution in making this technology viable. SAA already offers the communications standard, and language compatibility barriers will fall in time.

But full SAA benefits are still several years away, and MIS should carefully scrutinize any cooperative processing products claiming to be fully SAA compatible at this time.

In addition, we can see high-bandwidth, wider area LAN technologies on the horizon, reducing concerns over multiple transmissions in a conversational interchange.

Finally, MIS will probably get cooperative processing solutions from the major system software vendors, and these solutions will provide the requisite platforms upon which application processes can be built at reasonable cost. MIS can only hope that a single standard will eventually emerge.

What you can do now

Meanwhile, there is much that can be done. Integrating workstations into mainframe networks can provide immediate justifiable benefits in the context of local decision support and expert system processing, utilizing data downloaded from the mainframe.

In addition, off-the-shelf solutions to accommodate the selection and shipment of data will become abundant and reliable. MIS organizations are well advised to begin learning to work with LU6.2, even if they see no immediate need for the protocol. We cannot overstate the importance of LU6.2.

However, the commitment of significant resources and funds to a cooperative processing application today is a risky and questionable business decision.

IN SHORT, cooperative processing is not a bad idea; it is just a good idea whose time has not yet come.

The additional costs are difficult to assess and the benefits are suspect in the absence of comparative performance data.

The issue is undoubtedly controversial and will likely generate envied debates for some time.

Programmers enjoy the autonomy of personal computer development and as a generation of hackers become programmers/professionals, the pressure to go cooperative will increase. However, prudence suggests that MIS adopt a conservative strategy of patient observation, an admittedly difficult posture when the future looks so exciting.

Is cooperative processing for you?

By identifying the common functional elements of a business transaction that can be offloaded to a workstation, you can then determine the viability of cooperative processing for that application

Navigation (direct or via menu) to desired function	Yes	Security retains maximum integrity while remaining mainframe-resident
Query retrieval to locate specific data	No	
Key specification of primary data object(s) and initial retrieval	No	
External formulating and screen presentation	Yes	This category encompasses whatever manipulation of format is required to transform data from internal computational to external presentation format.
Screen receipt, syntax editing, internal formatting	Yes	Internal formatting is the reverse of above
Relational edits	Yes	Relational edits may consolidate a variety of tasks; successive fields must have preceding entries, occurring fields may not have duplicate entries and so on.
Foreign-key validation, code edits	?	These tasks are both difficult and impractical to consign to the workstation
Navigation between related screens of the business function	Yes	
Tutorial help	Yes	
Miscellaneous computation and processing	?	Computation-intensive processes not requiring mainframe data access are good candidates for workstation placement.
Interfaces with other mainframe applications	No	
Data-context processing	No	This constitutes update of the primary data object; update of additional items in other data bases is often required.

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MANAGEMENT

TAKING CHARGE

James Connolly

The show's over, folks



Remember the days when every morning's mail brought yet another glossy brochure from some association computer show that brought together in one convention center thousands of the world's leading MIS executives — the decision makers?

Those were the times when the National Computer Conference (NCC) measured its attendance by the tens of thousands, and it actually overflowed from the biggest convention halls into the parking lots. The computer portion of the Hanover Fair covered much of West Germany. Events such as the Info Show couldn't match the NCC in scale but still brought in thousands of attendees to prowl aisles of displays featuring mainframe, minicomputer and personal computer hardware and software, communications gear, cables, furniture and briefcases.

It seemed that every MIS professional association — even those targeted at narrow vertical markets — was involved as either a sponsor or a co-sponsor in what amounted to a general-purpose computer show. They were shows at which the MIS executives supposedly could see, test and ask questions about almost everything they needed to run their shops.

But when was the last time a high-ranking MIS executive went to such a show, except to do a friend a favor by speaking on a session panel? How many of those general-purpose shows even exist anymore? You can count them on the fingers of one hand. The manager and vendor participation is sluggish even at some of the vertical-market shows and the vendor-specific exhibitions.

Doesn't bemoan the loss of such shows, however. It may be a sign of maturity for the computer industry and the MIS world. It may be proof that MIS executives would rather hear the sales pitches of a few carefully chosen vendors in their own offices or at the vendors' customer support centers than dodge

Continued on page 154

Navigating the federal bureaucracy labyrinth

BY STEPHEN JONES
SPECIAL TO CPW

For the last 39 years, Marcelline Smith has opted for the government-issue version of MIS.

Working in a dingy three-story computer systems building tucked away near a huge airplane hangar, Smith has opted for a world of long government procurement cycles and increasingly tight federal budgets rather than the lucrative private-sector employment.

As chief of the computer systems and engineering division at the National Aeronautics and Space Administration's Ames Research Center in Moffett Field, Calif., Smith says she thrives on the challenge of guiding Ames' 900 engineers and scientists through the bureaucratic maze of computing on a federal budget.

"She can be very clever when it comes to getting the technology we need," says Anthony Gross, deputy chief of the center's fluid dynamics division. Among her accomplishments at Ames are an innovative leasing

program that brought the center its first Cray Research, Inc. supercomputer in short order and a contract service policy for end users that helps cut through government red tape.

Battle of the sexes

Smith's nearly four decades of allegiance to the space agency has wavered only once, but the reason had nothing to do with the demands of the high-powered job she has held. Nearly 22 years after the fact, Smith still winces when recalling the time she was discriminated against because she was a woman.

Smith had been climbing the ladder at male-dominated NASA unshaken until it came time to take a particular job that had been promised to her. Smith says that when her new boss found out he was getting a woman employee, he balked at the idea.

"It's the closest I got to quitting," says Smith, a diminutive 62-year-old who has the energy of someone half her age. "He didn't want a woman, and management supported him on it,

PROFILE

Marcelline Smith



Position: Chief of the computer systems and engineering division, NASA Ames Research Center, Moffett Field, Calif. Philosophy: "You have to make the most of what you have."

but it happened long ago."

Ironically, Smith says that the battle of the sexes was probably less of a problem when she started her career because women were not perceived as a threat. "It seems harder for women today, because the competition is so much more defined in the workplace; the calling for women is much more obvious," she says.

Smith says the climate has improved considerably since those days and that, while she is

not an aggressive "women's liberator," she regularly points out to Ames administrators problems that appear to have a gender root.

But Smith says she remains most of her time trying to deliver the massive computing power used by Ames researchers while working with a limited pocketbook. She knows the trials of too much demand and too little capital in her role as chairwoman of the center's Automated Data Processing Planning Board.

Continued on page 153

Unisys turns to IS people issues

BY JAMES CONNOLLY
OF STAFF

BLUE BELL, Pa. — Picture a merger and the concerns that blast into the information systems directors' minds. Different companies, different cultures. New policies, new procedures. Incompatibility. Excess employees — including IS executives.

The challenges can frightening even if the systems are compatible. When it is a merger of two \$5 billion giants that not only use but build incompatible systems, it means the headaches and long days endured by Alan G. Jones during the wedding of Sperry Corp. and Burroughs Corp. into Unisys Corp. in 1986.

After more than a year of merging, Jones has emerged an organization, Jones, who is Unisys' vice-president of information systems, and his staff looked at their infrastructure and how they utilize good systems professionals. This year, there has been a time for the Unisys IS group to work on people issues.

"We went the first 15 months of the merger without paying any attention to our internal pro-



UNISYS' Alan G. Jones

fessional practices. We were down in the trenches operating the organization," Jones says. "We now recognize that we have to pay attention to our most critical resource, which is the MIS professional workers, and help to build a portfolio of services and tools that gives him the most leverage he can have. We didn't get a chance to focus on that until we caught our breath at about the beginning of this year."

Jones heads an IS organization in which 1,000 employees report to him, and he has a dot-

dot-line relationship with 1,000 IS workers in subsidiaries. The IS group at Unisys headquarters include about 40 in a Development center, a dozen or more, where Jones is based, and dozens more throughout the world. The IS group supports a multiarchitecture network of 90,000 terminals and hundreds of implementations of about 15 core applications.

Human infrastructure

Work on the technical aspects of the merger continue, but Jones is focusing today on the recommendations of task forces that recently looked at people and organizational issues such as project management, system development methodology, packaging systems and performance appraisal. The recommendations call for new procedures and the use of a combination of other vendors' products with current and planned Unisys needs.

"They were basically 3GL. *Continued on page 147*

Inside

- A summary of CIM tips from the Autodict '88 conference, Page 149.
- Zale taps Kurney for MIS spot as Southland turns to outsiders, Page 152.
- DP trainers struggle for CASE adoption, Page 154.

Unisys merger: You wouldn't want to have to do it twice

BLUE BELL, Pa. — Merging the diverse Sperry Corp. and Burroughs Corp. systems and IS operations into a common group supporting Unisys Corp. was like being in Army basic training, according to Alan G. Jones, Unisys vice-president of information systems. It was a valuable experience, but he doesn't want to do it again.

Most of the technical work — a single set of applications and a 90,000-node network that supports transaction-level communications with any type of host — was completed in 1987. The key technical tools were Sperry's Mapper and Bur-

YOU'VE GOT to remember that we all were running full-tilt boogie here."

ALAN JONES
UNISYS

roughs' Linc fourth-generation languages (4GLs).

The key business tool was a focus team approach in which users and IS representatives from both companies examined the varied processes and systems used by each company.

The focus teams made recommendations on processes for business segments such as customer service, payroll and manufacturing. They sometimes adopted the Sperry approach, sometimes the Burroughs approach and sometimes a completely different approach supported by a new application developed with the 4GLs and prototyping.

Big changes

Those new applications had to consider not only that two large companies became one but also that Unisys was moving from what Jones calls the "iron box business" into software solutions.

"I think in any merger situation, the IS division bears the brunt. Our job is putting together the information they need to merge the companies and at the same time running the transactions that keep the company going," said Ray Perry, now vice-president of information systems at Avon Products, Inc. In 1986, Perry was vice-president of systems for Burroughs, and Jones held a comparable post at Sperry.

"The big scare is having to pull together two diverse technologies that have never even had a reason to work together," Perry said. Perry, who planned to leave Burroughs even before the merger, said he does not envy Jones' challenges, even today.

One of the most startling examples of what Unisys did with its systems was a sales compensation package that was based on a new pay structure and a business orientation.

The old Burroughs sales commission system contained 35,000 lines of code and seven on-line screens and could produce 60 reports and 150,000 transactions per month. The system took two years and 12 man-years to develop.

ly in the merger as planners experimented with ways to organize the company.

But not everything ran so smoothly. Jones said he wishes he had used focus teams on all aspects of the business. He cited the mistake of Unisys deciding automatically to use a Burroughs distribution system because Sperry did not have a formal system. Problems arose when the system was implemented, at which time it became apparent that Sperry facilities actually had informal distribution processes that should have been considered in systems development.

"One of the biggest problems was in the area of definitions," said Wilma H. Horne, staff vice-president of U.S. marketing information services. "Both companies had definitions and terms that they

used, and sometimes they overlapped. Sometimes they were subtle differences, but sometimes they were significant."

She noted differences on terms as simple as an order. A new system had to consider whether an order included everything related to a particular transaction, as Sperry treated it, or whether it included just what was delivered in a single day, as Burroughs defined it.

"You've got to remember that we all were running full-tilt boogie here," Jones said. "People would be in a meeting and they would hear a word and take off to do what had to be done based on their understanding, only to learn later that the word meant something different to all the other people."

JAMES CONNOLLY

A few words to anyone buying networking software like there's no tomorrow.

Unisys turns

CONTINUED FROM PAGE 145

products that we were trying to fit into our 4GL environment," Jones says. He explains that methodologies using a third-generation-language approach presume that business needs and processes will not change as applications develop. "Whatever new systems or processes you are working on has to recognize that the picture changes as the system evolves."

In packaging, Unisys is working on a computer architecture to which the system group selects platforms and software for specific needs. The intent is continued progress toward ensuring that developers use the most appropriate architecture

rather than the one they were familiar with in the old Sperry and Burroughs organizations.

An improved employee appraisal system is one key to Unisys' attempt to attract and make the most of IS workers. "I think our company has a pretty good performance appraisal process now, but by its very nature, it has to be very general," Jones says, noting that IS employees need special skills and knowledge that an appraisal system and a training policy must consider.

The target is to develop a personalized compensation plan for each employee. Thus far, the IS group has developed a model that shows how systems analysts can hone their talents. Now, Jones wants to extend that approach to other jobs and, eventually,

to tune the system to a point at which individual employees and supervisors will work out training agendas and the performance appraisal process will measure how well the goals were met. He says that the training process has to focus on quality, planning and team-building.

Staff Vice-President of U.S. Marketing Services Winnie H. Horne adds that Unisys is changing the way it recruits. She says that since the merger, the company has hired recent college graduates but that there is a growing need for IS employees who can begin applications work immediately by drawing on experience on the user side of the company.



Jones endured long days during merge

However, Horne notes that Unisys wants to avoid the mistake most companies make in hiring those former users' contributions by tying them up with traditional IS structures.

Jones, former vice-president of information systems at Sperry, notes that the recruiting policy is still taking shape, in part because cultural differences had to be ironed out.

"I noticed a difference in the kind of people that the IS organizations hired, and we changed our view and truly came up with an eclectic view as a result," Jones says. He says that Burroughs solicited the best educated people it could from top-level schools and that it was not uncommon for an entry-level programmer analyst to have an MBA. Sperry was more interested in people with technical orientations and moved them up through the ranks, he adds. The current orientation toward general business people rather than specialists, he says.

He also notes that the Burroughs IS organization was less concerned than Sperry's and was "more hands-on" with respect to information technology.

As a result of the merger and a resulting reorganization along lines of business rather than geography, the Unisys IS organization is a hybrid — essentially centralized, Jones says.

He cites his dotted-line relationship with the 20 IS centers serving 34 international subsidiaries. In those organizations, the technical aspects of the merger are still under way.

Part of the challenge outside the U.S. has been moving those groups onto a common application base. Jones notes that much of the immediate postmerger work centered on selecting an application to replace the two or more that Sperry and Burroughs ran; some of Unisys' foreign subsidiaries lack the expertise and systems to run those applications.

He points to Spain and Italy, where almost all of Unisys' installed base consists of Sperry 1100-type systems. "There was no Burroughs culture in any sense within those countries. That means that if you wanted to use a Burroughs processor and a Burroughs system, you couldn't even find equipment operators," Jones says. Similar problems arise with the Burroughs presence, overwhelming Sperry's, and the U.S.-based IS group chose a Sperry-based application.

"We are still wrestling with that problem," Jones adds, noting that Unisys is gradually phasing 1100-based products, such as the Mapper 4GL software to A series and Unix systems, so that foreign subsidiaries will not have to add strange hardware. "It's a selling point, but it is a selling point that I could have used on my own systems had the timing been earlier."

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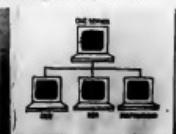
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Premier 100 feted at CW dinner

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

Strategic MIS was in the spotlight early this month as *Computerworld* honored the members of its Premier 100 group of information systems users at a New York dinner.

Executives from all manner of companies, such as Amoco Corp., The Travelers Corp., Banc One Corp. and Smith Kline Beckman Corp., shared vendor-sponsored tables with IDG Communications and *Computerworld* executives and editors.

Guests, many of whom represented midsize corporations without giant MIS budgets, said the recognition was a shot in the arm for their organizations.

The silent type

"Typically, ours is a quiet business. This was a great boost for our industry, because utilities are not often thought of as information technology leaders," said Tod Dixon, vice-president of the Information Resources group at Northeast Utilities, the No. 1 user.

After a brief address by IDG Chairman and founder Patrick McGovern, MIS executives representing seven of the top 10 companies received awards from *Computerworld*.

Among those accepting awards were: Dixon; Albert Hyland, director of information systems at Polaroid Corp.; Lawrence Bacon, vice-president of information systems at The Travelers Corp.; Kenneth Bender, vice-president of information systems at Southwestern Bell Corp.; Richard Crane, director of systems operations and telecommunications; and James McCarthy, director of systems development, both of Gillette Co.; Paul Maguire, manager of MIS at Bell Atlantic Corp.; and Allen Ditchfield, senior vice-president of information systems at MCI Communications Corp.

"I want to congratulate all the companies," McGovern said. "You all know how to get here next year; just be at the top of the list once again."

The Premier 100 is the first comprehensive listing of the most effective users of information systems in the U.S. Published Sept. 12, the 80-page supplement ranked 100 companies in 10 vertical industries.

Unlike other rating systems, the Premier 100 goes beyond the size of the budget or installation to evaluate companies using six criteria.

Those criteria include MIS budget as a percentage of revenue compared with an industry average, installed value as a percentage of revenue, amount of budget spent on training and personnel, the total number of personal computers and terminals as a percentage of total employees and company profitability during the last five years.

Vendors including On-Line Software, Inc., Novell, Inc., Siemens Information Systems, Inc., AT&T and Relational Technology, Inc. also sent representatives.



Left: (Bottom, from left) CW Editor Bill Lekter, Gillette's James McCarthy, CW Publisher Fritz Landmann, IDG Chairman Patrick McGovern, Southwestern Bell's Kenneth Bender, MCI's Allen Ditchfield. (Top) Bell Atlantic's Paul Ma-



grave, CW Executive Editor Paul Gilvin, Polaroid's Albert Hyland, Travelers' Larry Bassin, Northeast Utilities' Tod Dixon. Right: McGovern (right) presents award to Dixon.

PHOTO BY ANDY FREEMAN

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CIM reminiscences and tips

Autofact attendees share lessons learned at hard-knocks school

BY ELISABETH HORWITT
CW STAFF

CHICAGO — Managers recounting computer-integrated manufacturing (CIM) war stories, as well as some practical implementation tips, were among the most powerful drawing cards at the recent Autofact '86 conference.

At one packed seminar, Scott Lee, manufacturing systems manager for Welch Allyn, Inc., advised companies to take an integrated systems view: from database integration to workstations to lo-

cal-area networks, set up a framework for decentralized implementation and create a prioritized master plan.

Lee also set out a four-step approach to CIM:

- A needs analysis that should include current weaknesses, corporate business direction and a wish list of what CIM should do.

- A systems concept that should make use of available technology and incorporate existing equipment. "This is important since few of us are fortunate enough to work with brand-new plants" in which

equipment is installed from scratch, he said.

- A benefits analysis that includes project implementation costs. From this, it is possible to lay out financial priorities.

- System specifications, which should include applications that will be developed in-house, and a high-level implementation plan that integrates various technologies.

- "You can have stand-alone systems that still share information," Lee emphasized.

When one attendee asked how he could quantify CIM benefits to management, Lee advised him to translate intangible benefits like labor or material savings as much as possible. Quality, inventory and just about every other potential CIM benefit come down to those two hard cost areas, he said.

Lee made a strong pitch for using a combination of consultants and internal managers to develop a CIM cost-justification and implementation plan. He recalled that, as a consultant brought in to develop a CIM implementation plan for a General Electric Co. facility, he met with skeptics from executives who asked, "What do consultants know about the appliance business?" But as an internal manager working on a CIM plan for Welch Allyn's medical products division, Lee also ran into skeptics — this time because executives doubted internal employees would know enough about CIM.

Consultants are good at providing a structured approach that leaves nothing out, Lee said, but consulting sessions and identifying overlaps are rough, Lee said. They may have better knowledge of available technology and products.

Internal users are good at gathering information about how data flows as pieces of paper throughout the shop, and they can give good input into a statement of needs. "They can provide sanity checks on consultants' blue-sky concepts," he said.

"Overall, it takes both consulting and internal teams to put plans in place that management will buy into," Lee concluded.

At another seminar, Ulf Anderson, director of information systems at Pratt & Whitney Canada, laid out the CIM priorities that his team evolved. These included unattended operation except for equipment failures; employee ownership of both the product being manufactured and the systems involved; and fewer job titles, encouraging employees to gain access to knowledge about the business and manufacturing processes.

Among the tips that Anderson offered were the following:

- It is essential to have a continuous focus on goals or the result will be inconsistent management involvement in specific changes.
- Risks are necessary and problems inevitable, but unproven technology components are an unacceptable risk because they cause too much delay.
- Users need a clear understanding of vendors' limitations: "We broke too much new ground."

James Cae, director of manufacturing systems at General Motors Corp., posed on tips after heading the CIM effort at the auto giant's experimental Saginaw, Mich., plant. The 1980s issues for GM included the lack of a corporate manufacturing automation strategy and consistent CIM approach, a need for common methods to justify CIM and implementation of tools and practices across different GM divisions, he explained.

Lessons learned included the following:

- The need for a common core team to develop goals across the plant.
- The inadvisability of assigning people part-time to the CIM effort.
- The need to define vendor responsibility up-front. This lesson was learned after difficulties that arose from the initially unclear role GM subsidiary Electronic Data Systems Corp. was to play at GM, Cae said.
- The need to assess vendors' financial stability: Five or six of them that GM used are now out of business, according to Cae.
- The need to give users responsibility for CIM success instead of just leaving it up to the vendor.

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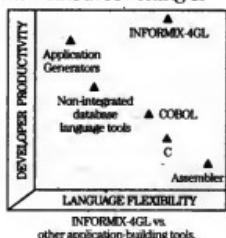
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Texas retailers revamp MIS

BY JAMES CONNOLLY
CW STAFF

Two key Texas-based retailers recently announced major changes in their MIS organizations, as jeweler Zale Corp. hired former Southland Corp. Vice-President MIS David Karney, and Southland then revealed plans to turn over its data processing and communications operations to outside firms.

Karney, 44, had spent more than five years at Dallas-based Southland, which operates more than 7,000 7-Eleven convenience stores, before he joined Zale as vice-president of MIS on Nov. 1.

Zale, a privately held company owned by Peoples Jewellers Ltd., operates 1,300 jewelry stores in the U.S.

"It was an opportunity to get into specialty retailing, which is an area I've always wanted to move into," Karney said, noting that Zale has a centralized MIS operation with development efforts already under way for a new retail information system and a new generation of in-store point-of-sale equipment.

Last week, Southland, which has cut back on its holdings and MIS spending since it went private in 1986, announced that it will shut down its data center within 30 days and then turn over that center

to Affiliated Computer Systems, Inc. (ACS).

Under a 10-year agreement, ACS will operate Southland's computer and telecommunications systems as well as offer jobs to Southland employees that have been dismissed.

However, Southland said it will retain its programming staff members, and former Karney aide Elliott McNeill has been appointed as Southland's manager of MIS.

"This agree-

ment contains a number of features that are very beneficial to Southland, including the opportunity to realize substantial cost savings in our computer service operation," Southland President Jerry W. Thompson said in announcing the service contract.

Karney said he had supported Southland's decision.

As part of the agreement, ACS will offer jobs to all of the 89 operations personnel and other employees let go by Southland (see story, page 155).

ACS, founded in July by three Texas bankers, is a data processing service provider that operates a network of Moneymaker automated teller machines, which are located primarily in 7-Eleven stores in Texas.



David Karney

CALENDAR

NOV 20-26

Competitive Manufacturing Today's American Business Stories. Cambridge, Mass., Nov. 21-22 — Contact: Advanced Manufacturing Research, 65 Federal St., Salem, Mass. 01970.

Domestic and International Technology Transfers Conference. Boston, Nov. 21-22 — Contact: American Conference Institute, Suite 1905, 67 Wall St., New York, N.Y. 10005.

NOV 27-DEC 3

American Society of Mechanical Engineers' Winter Annual Meeting. Chicago, Nov. 27-Dec. 3 — Contact: ASME Meetings Department, 345 E. 47th St., New York, N.Y. 10017.

USA '88 Expo and Conference. Dallas, Nov. 30 — Contact: Joey Schreiber, North American Telecommunications Association, 2000 M St. N.W., Washington, D.C. 20036.

IEEE Global Telecommunications Conference. N.Y. Substation, Holmdel, N.J., Nov. 19-Dec. 1 — Contact: GTEcom '88, 445 Henn Linc, Piscataway, N.J. 08854.

Engineering Workshops Conference. Los Angeles, Nov. 29 — Contact: Engineering Workshops Center, Inc., P.O. Box 8737, Santa Monica, Calif. 90403.

Implementation Strategies for Export Systems. Chicago, Nov. 29-30 — Contact: Decima Support Technology, Guidance Registration Office, 51 Church St., Scranton, Penn. 18510.

Satellite Management Forum on Client/Server Computing. Boston, Nov. 29-30 — Contact: Future Research, P.O. Box 1991, Cambridge, Mass. 02142.

Artificial Intelligence Exposition. New York, Nov. 29-Dec. 1 — Contact: Comdex & Jackson Tower Conference Management Co., Suite 400, Building E, 1000 Riverfront Road, Greeley, Ill. 60137.

CIO/88 International Conference. McLean, Va., Nov. 29-Dec. 2 — Contact: Cryptogram for Computer Systems, Suite 400, 1750 Old Meadow Road, McLean, Va. 22102.

New York Value-Date Integration in The Trading Business. New York, Nov. 28 — Contact: Value-Date Services, P.O. Box 2248, Rutherford, N.Y. 10570.

TDS Healthcare Systems Corp. Users Sound-American Meeting. Atlanta, Nov. 30 — Contact: Held Medical, 1000 Peachtree, TDS Healthcare Systems, 5447 Georgia Drive, Atlanta, Ga. 30328.

OMA/IS '88 Conference. San Antonio, Nov. 30-Dec. 2 — Contact: Urban & Regional Information Systems Association, 319 C St. S.E., Washington, D.C. 20002.

Small Business/Home Office Market Conference. Key Resource, Fla., Nov. 30-Dec. 2 — Contact: Q&P International, One Longview Circle, Norwell, Mass. 02061.

DEC 4-10

Managing Issues in Managing Information Technologies. Cambridge, Mass., Dec. 5-7 — Contact: Decision Support Techniques, Conference Registration Office, 51 Church St., Boston, Mass. 02116.

How smart planners have turned the Bell break-up into a significant strategic advantage:

Navigating

CONTINUED FROM PAGE 145

As the center's senior computer specialist, Smith leads the board in planning and executing Ames' overall computer acquisition strategy, which covers everything from personal computer modems to supercomputers.

This is no mean feat in the context of NASA. The space agency has to strike a delicate balance between belt-tightening pressures from the federal government and the need for extremely advanced scientific computing capabilities.

In many cases, no commercially available computers are powerful enough to crunch a variety of large-scale computing

needs that run the gamut from galactic dynamics to materials science and airflow evaluations.

Out of NASA's three U.S. research centers, Ames is considered to be the leading base for advanced scientific computation, said Victor Peterson, acting deputy director at Ames.

Power-hungry specialty

The center specializes in complex, power-hungry computerized studies such as computational fluid dynamics, flight simulation and wind tunnel testing. Ames' research finds its way into a variety of commercial and government aircraft, including NASA's space shuttles.

This kind of research puts tremendous demands on Ames' advanced but limited

big-iron resources. For one set of computational problems, researchers told Smith they would need one billion floating point operations per second of computing power.

"I have projects that have had flat budgets growth even though I'm saying we have to do these 17 new things. It's very tough," Smith says. "You have to make the most of what you have."

If anyone at Ames knows how to get the most computing bang for the buck, it is Smith. She came to Ames in 1959, when the research center was still working with analog computers, and has seen Ames and the entire computer industry grow in dramatic fashion.

"She has grown up with the computer systems at Ames; she truly is a fixture

here," Peterson says.

Smith can hold her own with most aeronautical engineers, discussing the mesh, drag or thrust of a vehicle design in her office while the skies overhead quake with the roar of a jet takeoff.

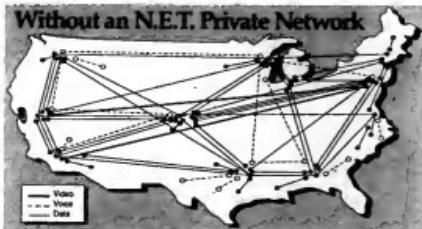
But it was a love of computers, not planes, that brought her to Ames fresh out of the San Francisco College for Women.

Over the years, Smith has helped develop the center's large-scale systems strategy while jumping through the federal government's regulatory hoops for equipment procurement.

As she tells it, her greatest satisfaction and best memories of her 39 years at Ames relate to helping users get through the same hoops without them knowing it.

To that end, Smith developed a plan that avoids bureaucratic entanglement for users seeking additional computer

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support services.

Under the scenario, a researcher programming on the Cray can get a programmer from outside the agency to work with him on a contract basis almost immediately. Ames has a renewable contract with StereSoft, Inc., to provide such services on a preset cost basis.

Without the network, a researcher would have to go through piles of paperwork and bookkeeping to seek bids for the contract work and satisfy time-consuming federal procurement rules. Approximately 300 people are currently employed under the plan, which has been in place for 20 years.

More recently, Smith devised a plan to get Cray supercomputers onto the Ames base with limited funds. Instead of buying the multimillion-dollar machines, Smith arranged a program in which Ames would lease a supercomputer from an outside business.

The rental plan, which itself costs millions of dollars, cut through what could have been a lengthy acquisition process. And by being a renter, Ames can trade up to new Cray models as they become available.

"Getting the Cray was a significant step for the center, and [Smith] offered us a way to get the machine more quickly," Gross says.

Gross plans to retire in the future, but she does not talk about specifics. She is still preoccupied with the idea of helping a researcher complete a difficult task with the help of a computer.

"I've been at Ames forever and have been exposed to a lot, and I still look around and see that there are so many things that need to be done," Smith says. "I'm not service-oriented as much as I am user-oriented."

Jones was formerly a West Coast correspondent for Computerworld.

FORTUNE, March 1988 N.E.T., Network Equipment Technologies and Our clients are winning are trademarks of Network Equipment Technologies, Inc.

Connolly

CONTINUED FROM PAGE 145

vendors' marketing bimbo and fill plastic tote bags with needless literature at some overpriced convention cities.

Most of the MIS executives and the legitimate vendors recognized that executives have better things to do with their time, such as talking to the heads of the user departments that they serve. MIS executives seem glad to leave the insanity of the show floor to subordinates, who attend the remaining user-oriented shows, and to the dealers and value-added resellers, who cope with Comdex.

But while the world would miss the computer show as much as the first

mouse missed the stomp of *Tyranno-saurus rex*, there may be a bit of a void and a few question marks left by the loss of the conference portion of the shows. Those conferences provided an opportunity for MIS executives to meet and share experiences with their peers and for the thousands of show attendees to have access to the sessions that interested them. It wasn't unusual for hundreds to pack a conference room to hear three or four MIS directors outline their strategies, successes and failures.

Some of that conference experience is available today at industry- and technology-specific shows that target the banking business or communications, for example. But those sessions are oriented toward helping people solve today's tech-

nical problems rather than broadening their exposure to general management issues. There are no management-oriented conferences, in which firms feature fairly narrow educational tracks and fairly hefty price tags that limit attendance to one or two people per company.

Even management-oriented conferences seldom attract top-level MIS executives, except for those who speak and then run to catch the next plane back to their office. It may be that the general information being presented is more useful to subordinates — who usually rank higher and are on a faster growth path than the subordinates sent to the computer show floor these days. Not only is there nothing wrong with having middle managers attend such conferences, it is a

necessity. A few leading consulting groups have better luck holding the attention of top MIS executives, but even then the attendance tends to come from a fairly narrow client base.

What is still missing is a forum at which executives can talk to executives and share experiences without fear of giving away proprietary information. It has to be something more than a three-day talking-head session. It requires give-and-take, the ultimate in peer-to-peer communications. A lot of organizations may say they offer such a forum now, but one wonders, because the MIS executives still only say what they want something better.

Connolly is Computerworld's senior editor, management.

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The Role of Distributing Database, C.J. Date (Codd & Date)

Database Directions, Panel discussion chaired by Sharon Wernberg (Codd & Date)

2. A Development Architecture

Understanding the CASE Environment, Michael F. Meirin (CASE Research)

Using CASE: Customer Experiences, Linda Natale (KnowledgeWare)

New Development Technologies, panel discussion chaired by Paul Wensinger

AI and Databases: Dr. Larry Harris (IA Corp.)

3. An Information Architecture

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DP trainers strive to adopt CASE implementation

BY DAVID A. LUDLUM

CW STAFF

MIAMI BEACH — Data processing trainers are embroiled in a struggle to help overcome resistance to the adoption of computer-aided software engineering (CASE) technology, according to participants at the ninth annual Data Training Conference and Exposition, held here earlier this month.

Chief stumbling blocks in implementing CASE include conveying the need for it, forging a consensus on one methodology and getting programmers to give up creativity, according to DP training managers who participated in a discussion of CASE.

Some programmers, especially older ones, view CASE as changing software development from an art to painting by numbers, according to James A. Randolph Jr., at the U.S. Air Force Global Weather Center in Omaha.

But such CASE-dodgers can become good-natured converts once they come to understand benefits of the tools, such as elimination of the need to reconstruct software modules like date/time stamp, Randolph said. "You have to use training to implement it, and don't forget the management level."

Larry Rinchuse of General Dynamics Corp.'s Data Systems Division in San Diego acknowledged that CASE restricts creativity but said programmers can still be creative by tailoring a methodology to the needs of a project.

Rinchuse likened resistance to CASE to MIS professionals' belated embrace of personal computers and underlined the need to counter fear of change. "In DP, every time you have a breakthrough in technology, people say it will go away. It's really hard to convince people that this is the wave of the future," he said.

One product touted on the exhibition floor reflects obstacles to the adoption of CASE. P. Michael, senior vice-president of On-line Software International, Inc., of Parsippany, N.J., said his firm soon-to-be-released Logical Data Design course is intended "to clear the way for acceptance of CASE." It links data integrity and system performance to analysis, modeling and normalization of data.



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*"Magnetography - A User Study" by Dattek Information Services. Bell Peripherals Corporation, 303 Wyman Street, Waltham, MA 02254

COMPUTER INDUSTRY

EXECUTIVE CORNER

Thomas A. Mays, 40, former general manager of NCR Corp.'s Engineering and Manufacturing facility in Cambridge, Ohio, has been named vice-president and general manager of NCR's Personal Computer Division. He will be responsible for development, production and marketing of NCR's line of personal computer products.

Mays succeeds Vernon W. Yates, 53, who has elected to take early retirement to pursue personal interests.

NCR also announced the appointment of John L. Giering, 44, as vice-president of finance and administration, effective Nov. 1. He succeeds D. W. "Russ"

Russler, 60, who has announced his retirement.

Giering was formerly president and general manager of NCR France. NCR announced that Christian Lhuissier, currently manager of systems marketing, NCR France, will succeed Giering as head of the European subsidiary.

Softguard Systems, Inc. in Sunnyvale, Calif., elected David L. Mosby to the position of president. Mosby had been acting president since Aug. 1, and before that had been the vice-president of sales and marketing for Softguard since September 1987.

Gilbert Cabral has been named president and chief executive officer of Micom Communications Corp., formerly Micom Systems, Inc.'s Integrating Networks Group division. This appointment coincided with the acquisition of Micom by an affiliate of Odyssey Partners, a New York investment firm.

Cabral, who joined Micom in 1985 as vice-president of finance and administration, most recently served as corporate vice-president of manufacturing. He had also been vice-president and corporate controller. Prior to joining Micom, Cabral was with General Telephone and Electronics for 13 years.

AST Research, Inc. announced the resignation of Albert C. Wong, co-chair-

man, chief technology officer and secretary, effective Nov. 11, to pursue personal, noncompetitive interests. Wong was a cofounder of the company; the first initial of his first name represents the "A" in AST. He will remain a member of the AST board of directors.

Symbolics, Inc. announced the appointment of John S. Wurts, its chairman of the board and CEO, to the position of president. Wurts had been chairman and CEO since May.

Ronald L. Derry, who served as president since February 1968, has resumed his responsibilities as vice-president of operations.

Software Publishing Corp. announced that Weston D. Richards vice-presi-



ASTA Women leading film

dent of sales and marketing, has resigned to pursue personal interests.

Kevin Conway, vice-president of domestic sales, and **Don Gordon**, vice-president of international sales, will now report directly to CEO **Fred M. Gibbons**.

Novell, Inc. announced the appointment of Mary Burnside as vice-president of operations, reporting to Raymond Noorda, Novell president and CEO. As head of the new operations entity within Novell, the position gives Burnside responsibility for corporatewide handling of materials and production of Netware and related products.

Automatic Data Processing, Inc. (ADP) announced the promotion of Joseph B. Pierret to corporate vice-president.

Firret, who joined ADP in 1974 as assistant treasurer, is currently treasurer and a staff vice-president of the company. He is responsible for all treasury-related functions, the ADP Credit Corp., facilities planning, purchasing and several other administrative functions.

Intelicorp, Inc. named Katharine C. Branscomb president and chief operating officer.

She has also been elected a member of the board of directors and will report to Thomas R. Kehler, CEO.

In addition, Edward A. Feigenbaum announced that he would not run for re-election as chairman of the board at the Nov. 21 shareholders' meeting. The board recommended the appointment of

Thomas T. van Overbeek, formerly president of Paradise Systems, Inc., has joined Cornerstone Technology Co. as president and CEO.

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Maintenance group gears up

BY JULIE PITTA
CW STAFF

SAN LUIS OBISPO, Calif. — A group of more than 40 third-party maintenance providers has banded together to find ways to improve relationships with large computer manufacturers.

Called the Parsing Group, the organization is led by Ray Ball, president of Parse, Inc., a manufacturer of hardware diagnostic tools used by third-party maintenance firms. According to Ball, the group was formed at the first Parse users group meeting held last May. A second meeting is scheduled for next May.

The group includes most of the big names in third-party computer maintenance, including Softek, Inc., TRW, Inc., Control Data Corp., Honeywell, Inc., General Electric Co. and McDonnell Douglas Computer Systems Co.

A pressing topic for many third-party maintenance suppliers is receiving a steady supply of parts, especially for proprietary systems, a topic the Parsing Group hopes to address. Other issues it hopes to cover include the repair and maintenance of new systems and im-

proving the image of third-party maintenance firms.

One independent maintenance consultant, however, was skeptical about service firms pursuing such an avenue. "The first thing these companies do when they have difficulty obtaining parts is go to court or join an association," said D. R. MacNaughton, president of Business Developers International, a Franklin Lakes, N.J.-based consulting firm to third-party maintenance providers.

"My sympathies are with the third parties, but they would do much better investing their money in first-class parts purchasing departments," he said.

Small firms tend to "follow the path of least resistance" when striking deals to purchase parts because of their limited resources, MacNaughton said. As a result, they tend to pay higher prices for spare parts and neglect to exhaust all possible sources.

Also, they have failed to enlist the help of their customers — the end user — to put pressure on the computer manufacturers to provide parts to third-party service companies, MacNaughton said.

Wilder

FROM PAGE 155

same panel at ADAPSO.

- Ed Cherney, the former CMI Council chairman who was active in the Computer Dealers and Lessors Association hierarchy for many years, is back as a CDLA member. At its meeting last month, the CDLA welcomed Cherney's new leasing company, Encore International, as a new member.

Wonder how well old

wounds have healed: Cherney

went to court last year to un-

successfully fight former CISD

Chairman Harry Goettmann's

CIS Corp. acquisition of CML.

- Thoughts on ADAPSO. First

the good: The ADAPSO Founda-

tion is one of the best projects

to come along from an industry

trade group in a long time.

More than just a funding charity,

the foundation is actively seek-

ing out and implementing —

computer technology to help

the handicapped. And last

month's fundraising dinner

Foundation roast of Broadview

Associate dealmaker Bernie

Goldstein, which raised nearly

\$100,000, was as hilarious as it

was lucrative.

Now the bad: Computer As-

sociates Chairman Charles Wang

chose his keynote speech words carefully but delivered some thought-provoking comments on ADAPSO's role in repre-

senting the software industry at last month's conference. He

said that small special-interest groups have little influence

on ADAPSO policies and posi-

tions — something that

ADAPSO should take a long

look at.

CA is not currently an ADAPSO member; ADAPSO

certainly shouldn't forsake in-

dustry goals to do CA's bidding,

but when any industry's largest

company does not belong to the

trade association, it is impor-

tant to ask why.

The bad part two: ADAPSO

is engaged in a worthy effort to

encourage high school and col-

lege students to consider com-

puter technology careers, but

early indications are that the

campaign is badly misdirected.

To illustrate the effort,

ADAPSO showed conference

attendees excerpts from a video

series for a high school-age audience featuring an impressive

array of industry chief execu-

tive officers (John Akers, Ken Ol-

sen, John Sculley and Bill

Gates, among others) encourag-

ing computer careers.

But the target audience is

not going to identify with celeb-

rit CEOs offering career ad-

vice.

An employee of a North Caro-

lina-based software firm watch-

ing the video remarked,

"They'd have more luck in my

town using Michael Jordan."

Much more promising is ADAP-

SO's encouragement to its

members to get out into their

communities and talk to stu-

dents.

That kind of personal out-

reach is much more effective

than John Sculley on the VCR.

• Industry social note: Veteran

Merrill Lynch software/services

industry analyst Steve McClellan

married Judy Hamilton, a

partner at Arthur Young and

formerly Computer Sciences'

first female vice-president, on

Oct. 29.

McClellan said it was the

most prominent software indus-

try marriage since VM Soft-

ware Chairman Bob Cook wed

Unitech Software President

Paula Brooks, a romance that

stemmed from their two compa-

nies sharing the same Reson,

Va., office building.

Reson assured that neither

one of these mergers were ar-

ranged by Broadview Asso-

ciates.

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itor, computer industry.

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ways enable your NETBIOS and Novell IPX LAN workstations to simultaneously share mainframe resources using multiple protocols and options at transfer rates up to 64 Kbs including SNA, BSC, DFT, and X.25.

Existing 3270 device solutions: RabbitCLUSTER gives your PCs the capa-

Koreans will chip away

Firms plan to fight U.S., Japan in DRAM ring

BY LORI VALICRA
BC NEWS SERVICE

SEOUL, South Korea — South Korea's major semiconductor manufacturers, which have lagged behind the U.S. and Japan in technology, are strengthening their presence in the 1-Mbit dynamic random-access memory (DRAM) chip market and preparing to commercialize 4-Mbit DRAMs in the next two years.

Entering the higher storage DRAM market is becoming a key to success for semiconductor operations within Korea's chaebols, or large companies. Daewoo Corp., the Lucky-Goldstar group, Hyundai Corp. and Samsung Co. — the three Hyundai will pass Goldstar in the Korean memory-maker ranking, primarily because it has made strong investments in the DRAM market.

Still, the Korean onslaught will take several years, and the chip makers will likely take only 10% of the worldwide semiconductor market, according to Chang-Soo Kim, senior managing director of Goldstar Co.'s semiconductor group. "Japan," he said, "should not be afraid of Korea."

he said. "We are a little kid on the block, and they are a giant. It took Japan 30 years to grow up."

Korea produced \$1.2 billion worth of all types of semiconductors in 1985, \$2.2 billion in 1987 and is expected to make \$2.8 billion in 1988, according to J. H. Son, general manager of Dataquest Korea in Seoul. Most of those are 256K-bit DRAMs. But, for only Samsung and Hyundai produce 1-Mbit DRAMs, but Goldstar will follow in the next year or so. Of the chips produced, 30% go to the domestic market, and the rest are exported to the U.S., Europe and the Far East.

Not too far behind

"If Japan stood still now, we could catch up in two to three years," said In-Soo Cho, senior manager in Samsung Electronics' semiconductor operation. Korea is behind Japan right now in memory technology, he said. Still, Seung-Yong Choi, another manager in the semiconductor operation, said most Japanese are very concerned about Korea catching up with them.

Korea still lacks strong re-

search and development facilities. With the help of the government, however, companies are moving on to 4-Mbit DRAMs.

The Korean government and four companies, including Goldstar, Hyundai and Samsung, have pumped \$1.00 million into a project to research and develop 4-Mbit DRAMs. Samples will reportedly be available by the end of this year.

"In some sense, the government is leading the high-tech industry in 4-M DRAMs," Cho said. "The government researches them, and the companies are developing them." Another \$100 million project running from 1989 to 1991 aims to develop 16-Mbit DRAMs.

B-Kwang Kim, vice-president and director of overseas marketing at Hyundai Electronics Co., said his firm has successfully developed a design for 4-Mbit DRAMs using the government program, and is shipping 1-Mbit DRAMs now.

Domestic consumption inside Korea has been growing, primarily because of the IBM-compatible personal computer business, Son said. In 1987, Korea consumed \$1.3 billion of its own semiconductors and is expected to reach \$1.8 billion worth in 1988, almost two-thirds of the total produced.

Rabbit has them all talking.



Henson discounts RISC

BY NORIBELGELDO
CERAMALUS
BC NEWS SERVICE

beit unintentional — move to classify CISC as "complex," because "complex" has a pejorative connotation.

However, he said the division between the two architectures is blurred. "Our computers, which would be classified as CISC systems, have many RISC elements in their structure," he said.

Only so many

Henson claimed the situation with gallium arsenide chips is very different because there is a limit to the number of circuits that can be put on a gallium chip.

"Very few systems use gallium arsenide," he said. "Gallium arsenide is very expensive — and super fast. In the future, when you see [gallium arsenide] RISC-based systems, you will see ultra-high performance — at high cost."

"Three or four years ago, it made sense to reduce the number of instructions so that you could put everything onto one chip," he said. "But today we can put a million circuits on a chip. In two or three years, that will be two million. There is almost no computer system that cannot be fully contained on a single piece of silicon that contains a million circuits."

"One of the principal developers of RISC, Carlos Bacon, who is a member of Prime's technology council, told me it is an academic discussion," Henson said. He said it was a clever — si-

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DEC Germany's growth stalls

BY ULF J. FROTTZHEIM
EDN NEWS SERVICE

MUNICH, West Germany — Digital Equipment Corp.'s West German subsidiary is mired in slow revenue growth and rising expenses. Staff size, investments and deprecations have reached record levels, but earnings have not followed suit.

Officials cited external influences in explaining the 7.7% annual growth rate in sales for fiscal 1988. In his introduction to the annual financial report, Willi Kister, chief of DEC Germany, based here, mustered up a variety of external factors to explain why the firm's growth curve no longer points to the horizon.

For one thing, he said, the already "hostile" investment posture during the past business year . . . has intensified even more as a result of the general uncertainty after the stock market crash and aggravated export conditions as a consequence of the weak dollar."

He also blamed "declining hardware prices; the appearance of new competition, mainly in the form of vendors of new specialty applications; the skepticism of

large groups of customers because of the standardization issue." And so, like last year, sales have risen at a very moderate rate, the report said. Revenue for the period July 1987 to June 1988 climbed to \$712 million from \$661 million.

Personnel expansion

Salaries per employee are also declining, as a result of personnel expansion. As of the report's publication on June 30, 3,630 employees worked for the company, almost 15% more than a year ago. Personnel costs climbed 16% to \$178 million.

Expenditures for the expansion of the work force were a burden on business results, a Chief Financial Officer Hans-Joachim Nowak observed, but they were "necessary requirements for a developing market." Just as were the material investments that year swelled to \$94 million from \$43 million.

Kister said he expected a "dramatic upswing" in information technology sales in West Germany during the next few years. As networking computers between and within companies becomes easier, an even bigger market will open up, he predicted.

Ex-Mtech

CONTINUED FROM PAGE 155

the owner of Mtech's biggest competitor in Texas, First Texas Savings' 800-site Moneymaker automated teller machine (ATM) network. In a complicated transaction, Deason and Houston-based Gibraltar Savings Association formed an investment group that acquired First Texas' Moneymaker Division, its Transfirst Corp. electronic funds transfer unit and its First Texas Computer Corp. data processing subsidiary and combined them all to form ACS in July.

"It was a terrifically sweetheart deal that gave them a huge chunk of business right out of the chute," said Stephen T. McClellan, a Merrill Lynch & Co. vice-president who follows the computer services industry.

Texas-size goals

Deason recruited an entire top management team right from Mtech, including ACS President and Chief Operating Officer Charles "Chuck" Young, Executive Vice-President Pete Hill and Vice-President of Commercial Sales Bryan Ward. With an asset base of about \$80 million and 350 employees, Deason has set Texas-size goals for ACS: \$100 million in revenue in its first year and \$500 million after five years.

Then e is little doubt that Deason wants to take market share right from Mtech's hide. "I predict that in the next three to five years, EDS will lose a minimum of half

of Mtech's clients," Deason said.

Can Deason do it? "Knowing his record, his strong background with Texas banks and thrifts and how hungry he is, I think he'll do quite well," McClellan said. "He's aggressively low-bidding Mtech clients and he hasn't won any yet, but the prospects are reasonably good."

Deason admitted that when he rails against the corporate culture and monolithic structure of EDS, "I sound like I'm running for office." But ACS is not completely fixated on the General Motors Corp. DP subsidiary or on competing solely with Mtech for financial processing services.

Earlier this month, ACS announced a 10-year contract with convenience-store giant Southland Corp. to run Southland's data center and other ACS employment to Southland's 89 data center workers (see story page 152). ACS plans to use these data centers as templates for other big commercial, nonfinancial processing contracts it hopes to land, according to Patrik Norville, ACS' assistant vice-president of communications. ACS had a foot in the door at Southland already; most of its Moneymaker ATMs are located in Southland's 7-Eleven stores.

On the horizon, Deason said he plans to take ACS public within two years and pursue an aggressive acquisition strategy along the way. If the whole scenario sounds like "Mtech II: Return of the Entrepreneur," that is just the way Deason wants it. "The strategy is almost identical — if it works, you tend to go back to it," Deason said.

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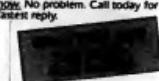
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COMPUTER CAREERS

These days, it's Hello, Mr. Chips

MIS professionals want to teach but encounter barriers at some schools

BY SALLY CUSACK
CW STAFF

Some MIS professionals who responded to Computerworld's 1988 job satisfaction survey said they would rather be working as a pilot, a chef or a rock musician. But of the respondents who said they have considered a career change, 12% said they would rather be teaching, making that occupation the most popular choice after self-employment [CW, Sept. 12].

Bolstering the supply of prospective professors is a glut of unemployed or underemployed MIS managers created by mergers and other consolidations, notes Leslie Ball, a principal at the Index Group, Inc. Ball says these people often look to consulting or teaching after a layoff or early retirement and that many are not doing well financially as consultants.

The modest pay traditionally associated with teaching may be less of an obstacle to entering the field than the lack of experience, according to Jerry Kanter, who became director of the Center for Information Management Studies at Babson College in Wellesley, Mass., following an early retirement from Honeywell Informa-

tion Systems, Inc.

Kanter says he thinks the pay gap between business and academia has narrowed in the last 10 years and that a retirement income plus an academic salary can equal or better an executive's pay.

The abundance of information systems professionals aspiring to teaching corresponds with strong demand for instructors of MIS at the college and university level.

Teachers wanted

"There is a tremendous shortage of MIS faculty in business schools," says Chuck Hickman, director of projects and member services at the American Assembly of Collegiate Schools of Business in St. Louis. According to data gathered by that organization, 23% of authorized tenure-track teaching positions in graduate and undergraduate MIS programs remained vacant in the 1987-88 academic year.

Lack of the doctoral degree required by many of the more prominent institutions of higher learning for tenure-track professorships disqualifies 90% of competent business people from getting the top job, according to Kanter. Some otherwise qualified candidates even have master's degrees and prior teaching experience, he says.

Such colleges and universities must be staffed with instructors who hold doctorates to maintain accreditation, Hickman says, so some of them are trying to convert faculty members from related fields into MIS instructors. They generally target professors of accounting, mathematics

and other disciplines. Hickman says he thinks the pay gap between business and academia has narrowed in the last 10 years and that a retirement income plus an academic salary can equal or better an executive's pay.

In addition to demonstrating knowledge of the field and a knack for teaching, schools generally require visiting or adjunct professors to have some plan for keeping abreast of technology and other developments. Hick-

more than 1,200 colleges and universities in the U.S. that offer business degrees, and nearly 700 of those award MBAs," he says. "The primary focus of these schools is on teaching, not on the research skills associated with the Ph.D."

In addition to demonstrating knowledge of the field and a knack for teaching, schools generally require visiting or adjunct professors to have some plan for keeping abreast of technology and other developments. Hick-

formation management staff at Xerox Corp. in Rochester, N.Y., has spent two months a year as a visiting scientist at the Sloan School of Management at MIT.

Benjamin says he plans on a teaching career when he retires from Xerox, and that the work should not require a doctorate. "I will be looking for something along the lines of a visiting professor status," Benjamin says. "I authored a book and I have been involved in the National Sciences Program, so I do not feel that a doctoral degree is relevant."

Doors don't know it all

Kanter says that, while, more business schools will realize that it is not crucial for many of their instructors to hold a doctorate. He says they will rely more on non tenured staff members, at least for night courses and other special classes.

Kanter, who broke into academics in 1967 when he helped launch Babson's first computer management course for an evening program, describes the college environment as more free than the business world. He can now accept speaking and consulting assignments, he says.

"Another thing I like about the transition is the different lifestyle," Kanter says. "Last summer, I bought a used three-speed bike. I ride to work when the weather permits. I have also rescued several neglected tweed sports coats from the attic."

Couch is Computerworld's new products writer.

THE FIELD IS changing very rapidly. Schools are becoming more and more competitive, subsequently making teachers with proven research skills a necessity."

CHUCK HICKMAN
AMERICAN ASSEMBLY OF COLLEGiate
SCHOOLS OF BUSINESS

or computer science, he says.

"The field is changing very rapidly. Schools are becoming more and more competitive, subsequently making teachers with proven research skills a necessity," Hickman says.

There are other avenues to academic open to the MIS manager seeking a change of career, however. Colleges and universities, particularly smaller ones, may hire them as visiting or adjunct professors without requiring a doctorate, Ball says.

Hickman agrees. "There are

man says. They also expect candidates from the corporate world to accept academic's collegial decision-making process and limited office support.

Prominent schools such as Harvard University, the University of California and the University of Georgia also employ visiting instructors, although these positions are more likely to go to executives on leave from major corporations.

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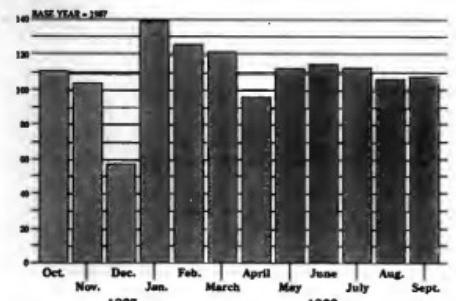


Table 6. Effects of temperature manipulations administered during the *C. formosana* and enhanced maize life cycles on *C. formosana*

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"...The quantity and quality of responses we've gotten from Computerworld have been better than those generated by any other form of advertising we've tried."

— Bob Stevenson
President
CIBER

Consulting comes first at CIBER — and that's even reflected in their name. CIBER stands for Consultants in Business Engineering and Research, a national company that's been providing top consulting services to the information processing departments of business and government clients since 1974.

In order to deliver superior services, the company needs to attract qualified consultants. And from there, CIBER — like any other business — needs to market itself to clients. CIBER meets both challenges with *Computerworld*, says company President Bob Stevenson.

"CIBER demands the most when it comes to hiring consultants, just as clients demand the most from consulting services. In addition to being technically competent, CIBER consultants should have both a professional attitude and a commitment to our clients.

"To attract this calibre of consulting talent, we go to the same source we use to attract clients — Computerworld.



That's because we know Computerworld is effective. We get national exposure to potential client companies, and we recruit highly qualified professionals for our consulting positions.

"In both instances, the quantity and quality of responses we've gotten from Computerworld have been better than those generated by any other form of advertising we've tried. We're definitely seeing a high return on our investment with Computerworld.

"The bottom line is that Computerworld works well for us. So we'll continue to rely on Computerworld as an important — and effective — part of our future."

Computerworld. We're helping serious employers and top computer professionals get together. Every week. Just ask Bob Stevenson.

For all the facts on how *Computerworld* can put you in touch with qualified personnel, call your local *Computerworld* Recruitment Advertising Sales Representative today.



COMPUTERWORLD

The weekly newspaper of record for computer professionals.

375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (800) 345-6474 (in MA call (617) 879-0700)

An IDG Communications Publication

"...We're trying to reach MIS and data communications professionals. And Computerworld effectively delivers both."

— Cesar Namba
Imperial Corporation of America

Cesar Namba is Assistant Vice President for MIS Recruitment at Imperial Corporation of America (ICA) in San Diego, California. ICA is a financial services organization that has savings and mortgage institutions in 20 states. For Cesar, filling important MIS/DP positions is the name of the game. Recently, ICA embarked upon a change in part of its corporate technology, and that meant that Cesar had to go to work finding qualified personnel. And for reaching the best possible candidates, he turned to *Computerworld*.

"Our goal in recruitment advertising is to do several things. Naturally, we want to fill vacant positions, and if we do it right away, that's great. But there's much more to it. We want our ads to create awareness of ICA as a company that hires MIS/DP professionals and we want to make contacts for future positions.

"Computerworld addresses all that we want our advertising to accomplish. First of all, it's such a well-read publication; everyone I deal with in the world of MIS reads it. Computerworld is our top choice for

reaching qualified candidates — in fact, we initially felt it would work even better for us than local newspapers.

"We were right. Computerworld does an excellent job of getting our image across to people — and getting them interested in our company. Maybe we'll hire someone right from the ad, which we do. Or maybe we'll impress upon quality people that we're regularly hiring in their fields, which is just as important to us. The bottom line is that Computerworld is the right vehicle for our target audience.

"One of the great things about Computerworld is that it's almost always kept around for reference. That means our ads stay around longer. Plus, we can expect to attract more experienced people through Computerworld."

Computerworld. We're helping serious employers and top professionals get together in the computer community. Every week. Just ask Cesar.

For all the facts on how *Computerworld* can put you in touch with qualified personnel, call your local *Computerworld* Recruitment Advertising Sales Representative today.



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An IDG Communications Publication

MARKETPLACE

Are you licensed to operate?

Terms of used system software registration vary widely among vendors

BY DAVID GABEL
SPECIAL TO CW

If you buy a used computer, can you also get the system software that it has been running?

It depends on the type of computer and the company that made the machine and licensed the software.

In the microcomputer marketplace, there has been so much controversy over copy protection and licensing that the publishers have pretty much given up trying to police use of second-hand software, according to Roy C. Davis, executive director of the National Association of Computer Dealers (NACD), whose members generally deal in small-used computers.

"Used computer stores sell used software all the time," Davis says. "You can get as much as 60% off list price for some titles."

Davis says if the owner of a microcomputer system resells the system to a dealer, the dealer may dismantle the system and sell the pieces individually, including software. "The software

is just easy money for the dealer," he says.

In most cases, when a customer buys used software from such a dealer or from the prior user, the publisher of the software will register the buyer as the new licensee and provide him with upgrades to new versions for a small fee.

Things are different in the minicomputer and mainframe field, in which policies on licensing used system software vary widely according to the hardware manufacturer.

The IBM way
IBM distinguishes between software that is licensed under an Agreement for License Program (ALP) or a Program Licensing Agreement (PLA).

The PLA, which covers all the software IBM sells for its Personal Computers and Personal Systems/2, requires no signature for use. In fact, there is no contractual arrangement between the user and IBM; users are licensed to use the software as soon as they break the shrink-wrap on the package.

"If the user sells the hardware to another person, then the software is transferable," an IBM spokesman says. No documentation is required, and buyers who register with IBM are

software licensing manager. Users can relicense DEC's operating system software and other packages essential to the operation of the computer by filling out a form signed by the seller and the buyer and sent to DEC. DEC verifies the original license and sends back copies of the form to the new user. There is no fee for the transfer.

Ed Clough, a spokesman for

filling out a form.

Prime Computer, Inc., like IBM, takes a tough stand on relicensing. "Users must relicense their software to use it," a spokesman says, "and they must pay the full original price for the software license."

See no evil

Do companies know if buyers of used computers fail to relicense software? "We don't," Clough acknowledges, "until the new user calls us with a problem. Then we'll say, 'Well, we don't have you as a registered user of the software.'" Then the user often will tell the licensee, "I

Am there people using software that they have not re-licensed? Almost assuredly. Some small vendors do not pursue the issue, says the NACD's Davis, even though some of the larger ones take a hard line.

Buyers of used computers should find out about the terms for relicensing the system software. Depending on the computer system, the terms could significantly affect the cost of the deal. And cost, after all, is a major reason for getting a used system in the first place.

Gabel is a free-lance writer and former data center manager based in Northport, NY.

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The BoCoEx index on used computers

Closing prices report for the week ending Nov. 4, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	\$725	\$900	\$400
XT Model 086	\$1,175	\$1,250	\$900
XT Model 090	\$1,300	\$1,575	\$1,050
AT Model 099	\$2,050	\$2,400	\$1,700
AT Model 230	\$2,400	\$2,900	\$1,800
AT Model 330	\$2,650	\$3,600	\$2,425
PS/2 Model 30	\$1,575	\$1,700	-\$1,300
PS/2 Model 50	\$2,350	\$2,600	\$1,900
Compaq Portable I	\$800	\$975	\$650
Portable II	\$1,825	\$2,000	\$1,650
Portable III	\$2,900	\$3,550	\$2,575
Portable 204	\$2,025	\$2,400	\$1,675
Plus	\$1,100	\$1,350	\$900
Desktop 20-MHz	\$1,100	\$1,500	\$900
Desktop 206	\$2,400	\$3,150	\$1,800
Desktop 306	\$4,500	\$5,100	\$4,100
Apple Macintosh 512	\$750	\$950	\$550
512E	\$850	\$1,025	\$600
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Plus 20-MHz	\$1,500	\$1,650	\$1,300
SE	\$1,900	\$1,950	\$1,700
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II	\$5,250	\$5,250	\$4,500
Apple Laserwriter Plus	\$2,700	\$3,000	\$2,350
NEC Multispeed	\$850	\$900	\$625

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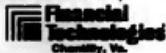
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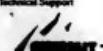
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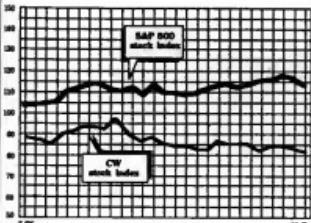
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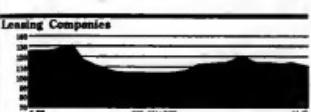
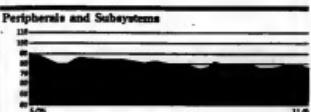
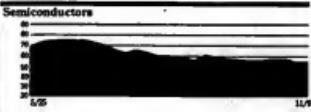
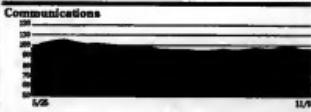
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N E W S

STOCK TRADING INDEX



<i>Index</i>	<i>Last Week</i>	<i>This Week</i>
Communications	97.7	97.5
Computer Systems	92.7	91.4
Software & DP Services	99.6	100.0
Semiconductors	55.7	55.9
Peripherals & Subsystems	78.3	77.7
Leasing Companies	115.8	111.4
Composite Index	83.6	82.8
S&P 500 Index	117.3	114.9



Computerworld Stock Trading Summary

CLOSING PRICE TUESDAY, MAY 10

SEARCH		PRICE		SEARCH		PRICE		SEARCH		PRICE	
SEARCH	RANGE	SEARCH	RANGE	SEARCH	RANGE	SEARCH	RANGE	SEARCH	RANGE	SEARCH	RANGE
SOFT-WARE	10000	SEARCH	10000								
RANGE	10000	SEARCH	10000								
(1)	10000	SEARCH	10000								

Communications and Network Services

Semiconductors

AYRA CORP.	36	21,125	6.3	13	R&T, INC.	REMEMBERONIC	15	8	\$2.05	0.4	4,111	
BELL AUTOMATICS CORP.	75	62	71,375	-6.8	32	TEXAS INSTRUMENTS INC.	TEXAS INSTRUMENTS INC.	37	37	\$1.75	-0.6	3,811
BELL AUTOMATICS CORP.	44	35	40,120	-1.8	35	WESTERN DIGITAL CORP.	WESTERN DIGITAL CORP.	12	11	12.15	-0.8	3,811
COMPRESSION LABS INC	1	5	3,750	0.0	1							
COMPUTER NETWORK TECH	3	1	1,910	0.0	60							
CONTUS CORP.	36	27	38	0.0	47							
DATAM SWITCH CORP.	10	4	5,375	0.1	32							

Periodicals

Computer Systems

ALLIED COMPUTER SYSTEMS	8	3	6.5	8.8	12.8
AT&T COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
ATOS COMPUTER SYSTEMS	12	12	7,850	4.8	32.3
ANDYAL COMPUTER SYSTEMS	36	13	1.7	1.4	1.4
APPLIED COMPUTER SYSTEMS	17	17	1.5	1.5	1.5
APPLE COMPUTER INC.	49	86	39,250	2.8	3.6
BELL MONTREAL COMPUTER SYSTEMS	16	11	2.5	2.5	2.5
COMPAQ COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
DATA GENERAL CORPORATION	1	1	1.5	1.5	1.5
DIGITAL EQUIPMENT CORP.	1	1	1.5	1.5	1.5
EMC COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
ENGENIERIE QUANTUM CORP.	1	1	1.5	1.5	1.5
EXCELSIOR COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
HEWLETT PACKARD COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
IBM COMPUTER SYSTEMS	14	6	13,375	0.8	0.8
INTEL COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
JESUS CHRISTIAN COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
KODAK COMPUTER SYSTEMS	3	7	7.125	0.8	0.8
LAMSON COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
MOTOROLA COMPUTER SYSTEMS	3	1	1.5	0.1	0.1
NEC COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
TEXTRONIC COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
UNISYS COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
VICOM COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
WESTERN DIGITAL COMPUTER SYSTEMS	1	1	1.5	1.5	1.5
ZENITH COMPUTER SYSTEMS	1	1	1.5	1.5	1.5

Leasing Companies

CONVENIENT TECH	8,913	-0.1	-1.9
CARTRIDGE WORKS CORP	1,000	-0.1	-1.0
CAVANAGH INC	97	81.25	-0.1
CDI CORP	1,000	-0.1	-1.0
DATA GEN CORP	1,000	-0.1	-1.0
DELL COMPUTER CORP	1,000	-0.1	-1.0
FLOATING POINT SYSTEMS	2,071	-0.1	-1.0
HAMILTON RADAR CO	4,776	-0.1	-1.0
HONEYWELL INC	1,000	-0.1	-1.0
IMPRES INC	18	7	17
CANTON INVESTMENTS INT'L	18	7	17
DETROITERS INC	18	7	17
CONTINENTAL INFO SVCS	18	7	17
DATA COMM INC	18	7	17
PRESIDENTIAL INC	18	7	17
REED BUSINESS INFORMATION	18	7	17
REED - HORNWELL - AMERICAN - NATION	18	7	17

No winners

Rumored cuts in buyout benefits stifle happy reaction to Bush win

The presidential election turned out to be a no-win proposition for the stock market last week.

Talk of incipient legal reform aimed at trimming the tax benefits of leveraged buyouts put a further crimp in the stock market surge that many believed would follow a Bush victory. IBM closed Thursday at 119%, down a half-point from 120% at the week's start. Digital Equipment Corp. dipped 1% points to close Thursday at 92%, while Hewlett-Packard Co. dropped $\frac{1}{4}$ of a point to 48%.

After reporting a small operating loss, Management Science America, Inc. (MSA) dropped 3% of a point in fairly heavy volume trading on Thursday, and MSA closed at 6 3/4, down 3/4 of a point.

On the upbeat side, Microsoft Corp., whose recent shipment of its Presentation Manager launched the final element of its vaunted new architecture into the commercial stream, rose 2 1/4 points to close Thursday at 49. It was a good week for Apple Computer, Inc., which closed on Thursday at 39 3/8, up 1 1/4 points. See Microsystems, Inc., 134, earlier in this column, Thursday at 20 1/4.

NELL MARGOLIS

Users wary of buggy Dbase IV

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — Drove users may not be defecting from the Ashton-Tate Corp. Dbase camp, but they are extremely wary of Dbase IV, a new product with bugs, compatibility problems and performance that is just not up to snuff for hard-core users.

Although Ashton-Tate has called Dbase IV its most thoroughly tested product ever, database experts are already reporting bugs that many users had feared. Ashton-Tate downplayed the infestation and said its technical support staff had heard of few problems.

Rich Finkelstein, of Performance Computing, put Ashton-Tate's SQL through its paces and found serious problems. "It's buggy. It allows you to do il-

legal views, and the union [a function for combining data from different tables and eliminating redundancy] doesn't work right," he said. Finkelstein, an SQL expert, also had trouble doing table joins and subqueries. "If I can find five bugs in 45 minutes, you've got a problem," said Finkelstein, who believes the product was simply delivered too soon. "It was careless."

Dan Watson, president of the Washington, D.C.-area Dbase user group, could SQL quite well but was not able to print reports.

Bugs and inconsistencies were also spotted by Dbase expert Adam Green. When using the Run command, which executes applications such as spreadsheets and word processors, the screen is erased, Green said. The Run command also scrambles the status line, Ashto-

ton-Tate confirmed.

Watson, president of the users group, loaded a Dbase III program into a final version of Dbase IV and found an immediate error. The first character in

IT'S BUGGY. It allows you to do illegal views, and the union doesn't work right."

RICH FINKELSTEIN
PERFORMANCE COMPUTING

the first field had been changed to Z. Meanwhile, Watson is going to wait on Dbase IV. "I will switch over when I am convinced it is solid. Ashton-Tate is not known for putting out bug-free

software," Watson said.

Many users with large investments in Dbase-style applications are loath to change to competing products. But those users will not move to Dbase IV until it has been proven.

Some users have already turned away from Ashton-Tate and may never look back. Two years ago, Sam McLawhorn listened as Ashton-Tate described its strategy of moving to larger systems and including SQL for seamless connectivity.

McLawhorn, who teaches Dbase and makes product recommendations, said he "stack his deck out" and advised users to wait for Dbase IV rather than switching to Dbase clones or high-end relational systems. "I had to put my tail between my legs and tell them I was wrong," said McLawhorn, who serves as MIS manager for the North Carolina Department of Agriculture.

McLawhorn complained that the SQL implementation is slow

and is not integrated with other aspects of the program. SQL itself is dynamic, McLawhorn said. But after leaving Dbase, users will say "SQL stinks."

Overall performance may also be disappointing. While Ashton-Tate claims a tenfold increase in performance, Green's benchmarks tell a different story. For sheer number-crunching, Green found Dbase IV 10 to 15 times faster than Dbase III.

But working with Dbase IV files may be slower. "The program is so big, and such a large percent is out on disk files, that it is essentially tied to the disk speed," Green said. "They are trying to stuff 10 pounds of functionality into a five-pound machine."

On average, Green says the product is only two to three times faster, still slower than competitors. And for those that have already booked onto the faster compatible train? "No one is going to go backward," Green said.

Axle

FROM PAGE 1

70,000-square-foot plant-cum-laboratory is designed for a synchronous flow of axle parts, said David M. Hitz, Vanguard's superintendent of operations.

The plant, which went operational this fall, aims to make 1,500 J-Car axles each day; it has reached only 40% of that goal to date.

More important, though, CIM processes developed here will soon show up at GM plants, including the Saturn factory that is scheduled to begin operations in Tennessee sometime next year.

Existing GM divisions are also invited to come to Vanguard to test new manufacturing techniques. The facility has set aside some space so that GM plants can literally hook new manufacturing cells into Vanguard's Manufacturing Automation Protocol (MAP) 2.1 broadband network.

At the plant, human resources, the division of which is adjacent to a full-fledged GM axle-parts factory, is just as im-

portant as CIM. "The vast majority of your workers [here] is not working with wrenches and screwdrivers," Hitz said. "It's processing data and making decisions. What becomes paramount are the social issues."

When GM decided to start a "factory of the future" project in 1982, Hitz said, it had implemented some human engineering in the Vanguard design plans. That included granting workers the sense of choice in how they will fit production goals and some discretion in scheduling time off.

To change the work attitudes that had been formed by years of standard assembly-line operations, GM trained Vanguard's 24 system attendants for one year and its 20 skilled trades personnel for six months. There are a total of just 12 salaried management people on staff.

Because of United Auto Workers (UAW) seniority rules, none of Vanguard's employees has less than 20 years of experience with GM.

The UAW agreed to the automated plant, Hitz said, once the plan was presented as an additional source of jobs for the automated plant.

The division manufactures steering gears, axles for front-wheel drive and rear-wheel drive cars, hydraulic pumps and brake parts at four U.S. sites.

The Saginaw division also has factory sites in Spain, the UK, Mexico, Brazil and at a joint venture Daewoo facility in South Korea.

At Vanguard, workers spend just as much time in office cubicles as they do on the plant floor, Burridge said.

While off the floor, Vanguard managers and workers examine statistical reports generated by cell controllers and stored in the Stratus Computer, Inc. XA 2000 host.

An Oracle Corp. relational database handles the integrated CIM database and receives queries from a remote IBM 3034 host via industry-standard SQL. The off-site IBM mainframe transmits customer orders but has no direct control over the manufacturing process.

Down on the plant floor, cell controllers are similar in design to an IBM Personal Computer AT made by a third-party systems integrator. Unlike many



AT GM's Vanguard, only two of the three shifts are staffed

since 1984.

"We wanted to make the system as portable as possible," he explained. At first, a team of 50 programmers worked to write the Vanguard system. Now, only 15 EDS programmers maintain and maintain the code, Furio said.

The Vanguard software system is composed of functional modules that control and monitor the activities on Vanguard's factory floor. The system is able to process the real-time manufacturing process to plant managers for modification, if that becomes necessary.

"We can build a snapshot of what's going on in the factory, mesh the new schedule with the old one and generate all the subordinate schedules," Furio said.

At Vanguard, it is not just the systems but the people who count. Only 10 of the factory's 300 workers are staffed. Since most Vanguard workers prefer to go home at 3 p.m., the robots are left to work unattended during the swing shift.

"We're sailing for light-out," Hitz said. "But for now, it's more practical to say that we're hands-off."

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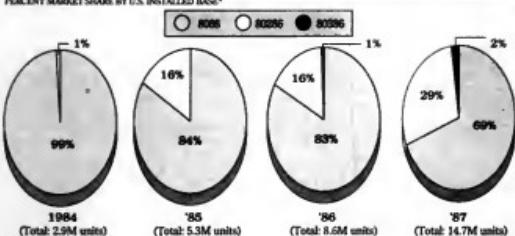
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TRENDS

PC hardware

Intel 8088 still leads the race despite entry of souped-up models

PERCENT MARKET SHARE BY U.S. INSTALLED BASE*



* Intel-based PCs only

As systems based on the Intel Corp. 8088 get on its years and despite the marketing emphasis on Intel's 80386 systems, Intel 80286-based systems are now dominating personal computer sales. This is helping the processor to gain market share of the installed base of PCs.

Figures from International Data Corp. (IDC) in Framingham, Mass., indicate that the 80386 still has to overcome some market hurdles before it gets any more of the pie.

One factor that is affecting the three different processors' growth rate is cost. IDC cost analysis indicates the 8088 is less than half of what it was at the end of 1987. Costs for the 80286 and 80386 have fallen sharply as well, but not to the same degree as the 8088.

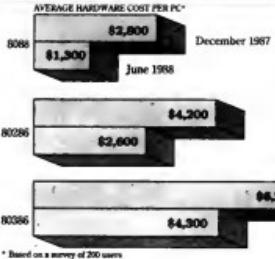
Another factor is the dearth of applications in the market that can exploit the 80386's power. Most PC applications run on the 8088, while software applications hitting the market run most efficiently on the 80286 processor.

IDC said that without an entire new generation of applications that will exploit the 80386, users will remain content with the 80286 systems, which are adequate for Lotus Development Corp. 1-2-3 and word processing software.

The 80286 system sales will be complemented by IBM's OS/2 if and when the operating system gains market acceptance. The 80286 can support OS/2, but some concerns about whether all but the 20-MHz version will be overwhelmed by OS/2's performance demands have yet to be fully explored.

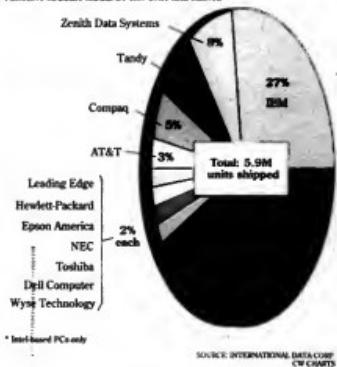
WILLIAM BRANDEL

Hardware costs are being chiseled down



IBM inroads not as deep as they could be

PERCENT MARKET SHARE BY UNIT SHIPMENTS*



INSIDE LINES

Will it be a snow job? IBM is expected to present a white paper report at Comdex/Fall '88 explaining its Micro Channel Architecture utility patent licensing structure. The position paper is expected to state that, contrary to popular opinion and IBM's contention, the potential "Goliath" never intended to charge a 5% rate on the MCA bus. Close vendors and add-in hardware makers may be offered up to a two-year moratorium on payment of fees pertaining to the licensing of MCA utility patents as well as assistance with technological development. Responding to the rumored MCA statement, industry observers say they are still weary of getting hit with retroactive license charges after the moratorium is lifted. Asim PC AT-close vendors have been hit by the retroactive royalty bug.

Singing the blues. Look for a Comdex song and dance from Apple on the virtues of IBM PC connectivity. In addition to distributing 50,000 Microsoft MS-DOS-based diskettes that contain a tutorial on Macintosh-PC communications, Apple is also expected to announce an agreement with Metacomm, possibly to bundle a driver for the micro-to-mainframe connectivity supplier's 3270 or 5250 board with its Macworldkit, which is still wending its way through beta testing.

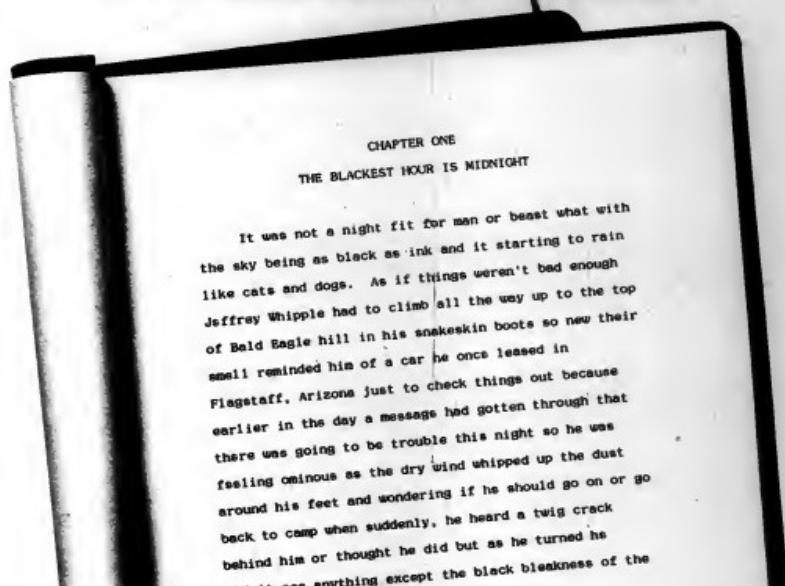
Sounds logical to us. At Comdex, Novell is expected to follow up its system reliability strategy with two more announcements today. One is a hardware-independent logical-link software gateway that connects to IBM's Systems Network Architecture; the idea is to have one gateway serve multiple PCs on a local-area network instead of mid-size terminals at roughly \$1,000 a pop. In addition, Steven J. Nancy Woodward, now head of Novell's Development Products Division, is slated to speak, spending sometime on a confirmed database announcement will involve an SQL-compliant database, good-bye Oracle Corp. The database developer refused to confirm or deny whether it will be one of the "special guests" at Novell's press briefing.

"What's happening outside of Vegas?" you ask? Management Science America, Inc. will announce a new cooperative processing line tomorrow designed to take advantage of intelligent workstations. The announcement will include PC-based front ends to MSA's mainframe applications. The new products are the result of a recent \$3 million agreement with Multisoft, Inc., an Edison, N.J.-based firm that sells Infront, a program that allows development of PC-based front ends for existing mainframe applications. MSA purchased the right to use and license the Infront product from Multisoft and the option to use another, Infront HPO, which allows development of more full-function 16.2-like cooperative applications. The cooperative processing line is likely to put MSA in front of competitors such as McCormack & Dodge in terms of cooperative applications.

In our own backyard . . . A few miles down Route 128, Honeywell Bull is set to unveil a new top-of-the-line mainframe today based on NBC's System 3000 mainframe, according to company analysts. The machine, which was code-named Taurus but will be offered as the DPS-9000, has been positioned by Honeywell as the "fastest general-purpose mainframe" on the market. Analysts said it is unlikely that Honeywell will win many new customers, but the DPS-9000 will be welcomed by the company's installed base. The company's current high-end mainframe, the DPS-90, was introduced in 1985.

The Duke comes on strong at the end, but it was too little, too late to stem voter flight to the Grand Old Peepshow party. As the liberals ran for cover in Harvard's red square, quizzing all the thought that the election of a sitting vice-president may set a precedent to be followed four or eight years hence, News Editor Pete Bartels bumbled over the hot line (900-343-0474 or 800-873-0700), saying that he'd passed up the annual Las Vegas Comdex jamboree. If you also sent others in your place, give him a call and pass on some real news so he can tell the boss again next year.

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C-C

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To achieve this, Home Box Office selected the Payroll System from Management Science America, Inc. Specifically, they wanted an online payroll system that could accommodate overtime, hours register and payroll register reports, as well as take care of special union calculations and an overtime shift. They also wanted a system that could do an accurate job of balancing taxes.

"The MSA Payroll System is the best system available," says Dave MacLean, Home Box Office's manager of financial information systems. "We especially like the capability of online check calculation which allows us to do automatic deduction for vacation, bonus, termination, or salary checks every week without having to make manual adjustments."

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